

Backwoods Home magazine



practical ideas for self-reliant living

History of the **EARTH**

Independent energy
Cooking for a crowd
Remembering dad
Indian pear trees
Wild vegetables

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Jan/Feb 2000
No. 61
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The Power of the Sun Within Reach

Backwoods Home Magazine is written for people who have a desire to pursue personal independence, self sufficiency, and their dreams. It offers "how to" articles on owner-built housing, independent energy, gardening, health, self-employment, country living, and other topics related to an independent and self-reliant lifestyle.

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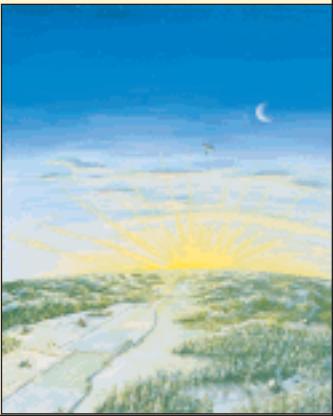
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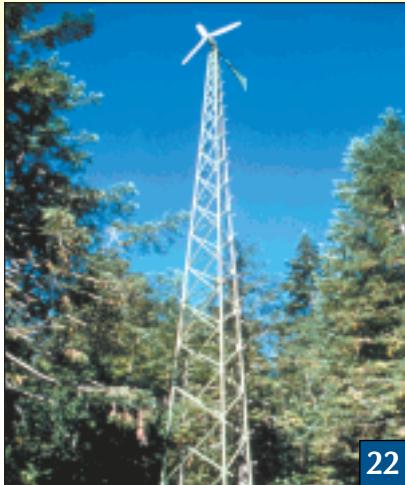
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ABOUT THE COVER

After the Nov./Dec. issue which portrayed a celestial view of the earth, Dave wanted us to look a little closer and see a warm sunrise over a rural backwoods environment for the new millennium. This positive approach to Y2K is portrayed by artist John C. Dean in this issue, which depicts a rural valley surrounded by forest land and homesteads on a wintry morning in the year 2000.



FEATURES



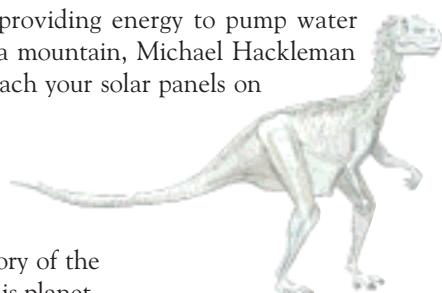
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Most independent energy systems are built around alternating current, but Michael Hackleman presents a 12-point argument in favor of incorporating direct current into your own system.

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When confronted with the difficult task of providing energy to pump water using a PV system that lay in the shadow of a mountain, Michael Hackleman provides a simple solution: if the sun won't reach your solar panels on the ground, raise the panels to meet the sun.



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Jackie Clay has two gardens. One is in her yard but the other stretches from her front door to beyond the horizon. In this article she tells you how to identify, harvest, cook, and can delicious "weeds" that can become regular table fare at your house.

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Publisher's Note

Launching our second decade

January 1, 2000 marks two beginnings, one of them interesting and the other important. The interesting one is that it begins the final year of the old millennium, as the new millennium will not actually begin until January 1, 2001. The important one is that it begins the first year of our second decade in business.

To help celebrate we invited noted independent energy author Michael Hackleman to visit the magazine's offices for a week and help put out this issue. Michael is the author of several popular energy books—on electric vehicles, wind machines, and alternative energy—and he has written feature articles on independent energy in each of our last seven issues. He is very well regarded in the field.

While here he worked closely with our layout artist Mark Cogan, John Silveira, and me. We had a great time, sipping a few Guinesses while getting a lot of writing and layout work done, and generally exchanging a lot of ideas on how to make the magazine even more useful and interesting than it has been for its first decade. Michael will figure into that improvement, as we plan to devote more space to independent energy such as wind, water, and photovoltaics. These technologies have come down in price considerably during the past decade, while the products have gotten far more efficient. As a result they are finding their way into the homes of not just people who want to make an environmental statement, but into the homes of people who want to be energy independent, like much of our readership.



Senior Editor John Silveira greets Michael Hackleman at the tiny and old Gold Beach Greyhound Bus Station.



Operations Manager Ron Graham says he wants to "cut out" everything that gets in the way of efficiency.

Efficiency, efficiency, efficiency...

In our first decade we've also become more efficient, so that now we can boast that we get an order on its way to a reader within 24 hours of taking it. That credit goes to our order-fulfillment staff, which includes Ron Graham, Teri-Lynn Hook, Nathalie Graham, Muriel Sutherland, and Jean L'Heureux. Strong coordination between these people have got the magazine humming like a fine-tuned machine.

Pocket-sized Constitution book

You may notice the ad on page 93 of this issue. This tiny shirt pocket-sized book has been a big seller for us, and because it is so cheap we have begun donating them free to grammar and high school classes in our area of Oregon so that young people can learn for themselves what great freedoms we are supposed to have as Americans.

Financially, we can only supply free books to so many classrooms, but perhaps some readers out there would like to do what we are doing. Just call us at 1-800-835-2418.

Complete "back issue set" winner

Robert Hickle of Brandon, Florida, is this issue's winner of a complete set of back issues. We'll draw one more winner next issue from among our three-year or longer subscribers, as we are down to only a few complete sets left in our inventory. The final drawing will be January 5, 1900.

My view

Remembering a decade of *BHM*

Deadline has just ended as I sit down to write this, the last remaining page of this issue. The staff has gone home, and, except for Silveira who has fallen asleep in a chair near his desk, I am alone in our Gold Beach office. With a calming Guinness by my keyboard, it gives me time to reflect on all the other stressful deadlines I've been through in the 10-year history of *Backwoods Home Magazine*. I cannot remember an easy deadline, but I can remember many post-deadline exhilarations, with editors shaking each other's hands or giving a whoop of triumph at having beat the clock again. After we dropped this issue's editorial package into the hands of Federal Express at 12:15 this afternoon, Jean L'Heureux quipped, "Great! Dave will be in a good mood again."

This is a tough business to be in if you are hell-bent on doing a good job. As I reflect on issues past I wince at the times we blew it, like when we published the names and addresses of several outlets where readers could buy inexpensive prescription drugs. I had bought the article on deadline, rushed a contract to the writer, and published it without checking that the outlets were legit. None of the outlets even existed; I had been had by an overzealous writer who didn't check his dated information. I apologized to readers for months, and I vowed I would never be had again.

But I remember far more times when we got the articles right, when we published important information by writers who had never been published before, or when we recruited pros like Yeager, Williams, Ayoob, Blunt, Thomsen, Fallick, Geissal, Evangelista, Hooker, Modeland, Harris, Waterman, Shober, Sanders, Clay, Hackleman, and many others. Great information couched in great writing.

The best find of our decade has been Silveira, who has been with the magazine since the beginning as a writer, then as part-time editor, then finally as the main editor. He is our "walking encyclopedia" in the office, able to call up facts from the deep recesses of his mind to confirm or refute an article's assertions. He and I have wrought miracles on deadlines, extracting order from chaos as the clock ticked down. And his historical pieces have anchored many issues.

The magazine has had its serious financial ups and downs, but each year we have grown a little stronger so that today we are financially strong, even able to provide a medical insurance plan for our employees. We have also fought the political wars, being banned by some bookstores because of our libertarian slant. We were even banned (and remain so today) by *The Mother Earth News* and other magazines who feared us for political and economic reasons. And like Ayn Rand of *Atlas Shrugged*, we never got favorable press from



John Silveira after deadline

the media, but we grew strong anyway on a wave of readers who sought our information, and either tolerated or embraced our libertarianism. We didn't care which because we weren't going to change.

But we never lost focus of what our primary objective was: publish high quality how-to self-reliance articles in a high quality magazine. Writers always came first, which is not so with most magazines. Writers got paid before I did. Some writers were too expensive for us, so we bartered with them with advertising and products. Anything it took to get the articles we wanted.

As a rule we accept about one of every ten articles submitted to the magazine. Some of the rejected articles get printed in other magazines (I saw two yesterday at the local market). But we often buy articles that no other magazine would touch because their editors can't see the crucial information hidden under the unsophisticated prose. We extract the information, work with the writer to retain his "voice," and behold, an informative gem that could only appear in *Backwoods Home Magazine* is born. It is a skill John Shuttleworth, founder of *TMEN*, and I have talked about. "In 10 years of publishing *Mother*," he once told me, "I never found anyone who could handle copy the way I wanted it handled." I found John Silveira.

It is a relaxed, humor-filled atmosphere here at *BHM*, with one-liners the rule of the day. But we work like dogs on deadline, and I run deadline like I am Captain Ahab of the Pequod. Rather than a great whale, I chase the great issue and I am sometimes not fun to be around then. But when deadline is done, my harried crew realizes we have produced a good magazine, and they are justly proud of their exhaustion and their achievement.

So what's in store for us for the new decade we embark upon today? More of the same. We will change if we can improve the product, and we will continue to grow by word of mouth. Thank you for subscribing. — Dave

A (VERY) SHORT HISTORY of the EARTH

BY JOHN SILVEIRA

How old is the universe? The best estimates, by the scientists who study such things, is that it's anywhere from 10 to 20 billion years old. Their latest guess is that it's probably some 12 billion years old, but this figure may change as more is discovered about the universe around us.

However, there is a minority of scientists who feel the universe has always existed and in some way is either constantly recreating or recycling itself. This would make the age of the universe infinite.

What scientists are a little more certain of is the age of the sun and its planets including our earth. Our solar system is thought to have formed some 4.6 billion years ago.

It's difficult to appreciate just how much time 4.6 billion years is. Even mathematicians cannot comprehend numbers this large. However, one way large numbers can be put into perspective is by comparing them to other large numbers. This is why timelines are frequently used to map

out events in both modern and prehistoric history.

For this exercise we're going to see if we can get an appreciation of the age of the earth and, to do so, we are going to build the largest timeline you are ever likely to see.

As in last month's article on space, we're going to use a football field. But this time the football field will represent time instead of space.

Creating a timeline

If we imagine the football field to be our timeline, with the creation of our solar system sitting on one goal line and the present on the other, we can stroll along the field and mark where certain significant events in our planet's history took place.

FYI: It is now believed that the moon was formed early in the history of the earth when another cosmic body, about the size of the planet Mars, collided with the earth. The matter ejected after the fierce explosion fell into an orbit around the earth and coalesced to form the moon.

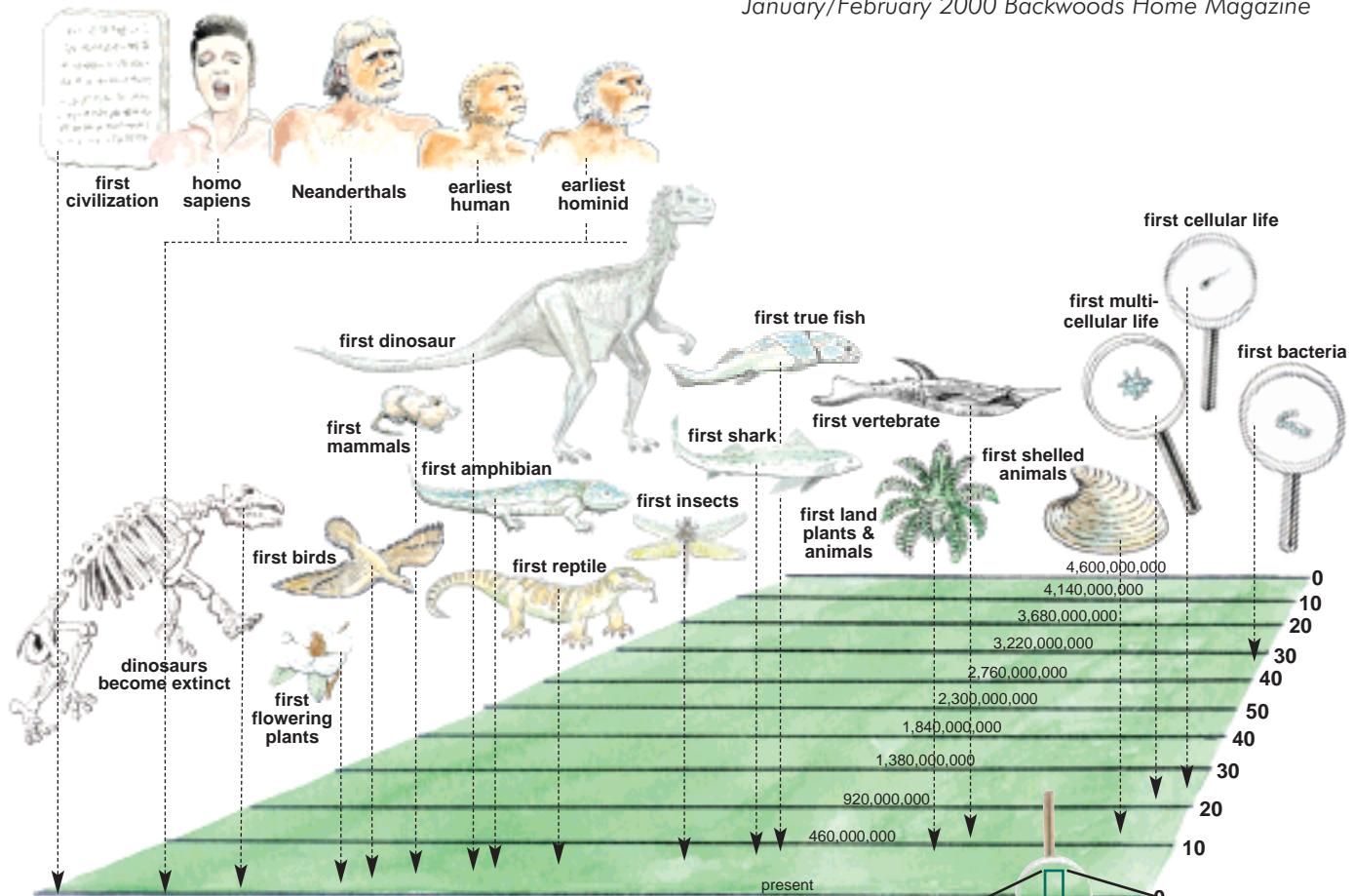
There are events in the history of the earth that are worth noting. Besides the earth's formation, we should include when life first appeared, the appearance of higher life-forms, and even the appearance of man himself.

The dates I provide are approximate because no one knows exactly when any species arose. No human was there to mark a calendar when they occurred. All we can do is infer approximate dates by using various dating techniques.

So, let's take a walk and see approximately where on our timeline some of these events are thought to have occurred.

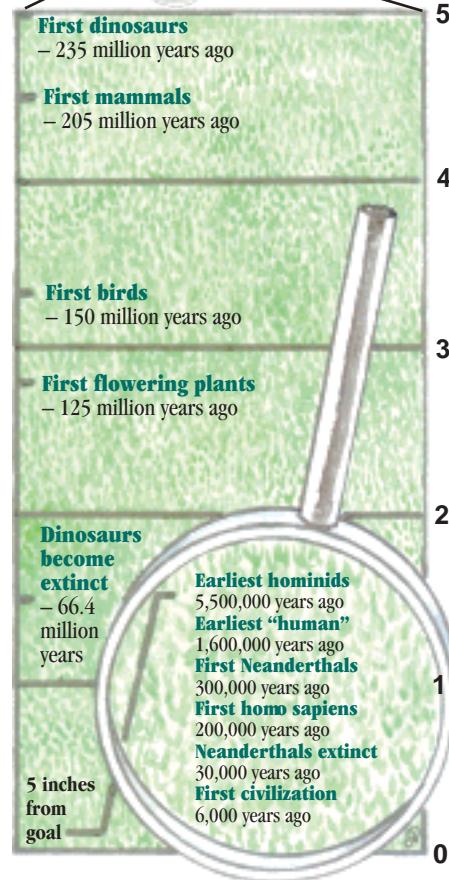
It's best before trying this exercise for you to guess where on the field some of the important events in the earth's history occurred. I'll give you a list worth considering. Before reading further (and, in particular, before looking at the table on the next page) you should copy the following list on a piece of paper and beside each entry write your guess for where on the football field its occurrence should be placed.

To help you, let's see how much time ten yards, one yard, a foot, and



Important events in the earth's history

Event	Years ago	Position on field
Creation of the solar system	4,600,000,000	goal line
First bacterial life	3,100,000,000	32½ yard line
Midpoint of the earth's history – 50 yard line		
First cellular life	1,200,000,000	26 yard line
First multicellular life	1,000,000,000	21¾ yard line
First shelled animals	570,000,000	12½ yard line
First vertebrates	515,000,000	11¼ yards from goal
First land plants and animals	440,000,000	9½ yard line
First true fish	410,000,000	9 yard line
First sharks	400,000,000	8¾ yard line
First insects	390,000,000	8½ yard line
First amphibians	360,000,000	7¾ yard line
First reptiles	335,000,000	7½ yard line
First dinosaurs	235,000,000	5 yard line
First mammals	205,000,000	4½ yard line
First birds	150,000,000	3½ yard line
First flowering plants	125,000,000	2¾ yard line
Dinosaurs become extinct	66,400,000	1½ yard line
Earliest hominids	5,500,000	4⅓ inches from goal
Earliest "human"	1,600,000	1¼ inch from goal
First Neanderthals	300,000	¼ inch from goal
First homo sapiens	200,000	⅛ inch from goal
Neanderthals become extinct	30,000	1/40th inch from goal
First civilization	6,000	1/200th inch from goal



even an inch represents on our timeline. It's easy to do: if the entire 100 yards of the field represents 4.6 billion years, then dividing 4.6 billion by 10 we can see that each 10 yards represents 460 million years. Dividing 460 million by 10 we see each yard is 46 million years. Dividing 46 million by 3 tells us each foot represents $1\frac{1}{3}$ million years. And dividing $1\frac{1}{3}$ million by 12 tells us each inch represents just a smidgen over $1\frac{1}{4}$ million years.

After placing the creation of the earth on one goal line and the present on the other, here's our short list of events to consider:

- First life of any sort on the planet, i.e., bacterial life
- First vertebrates (these are the first animals with backbones)
- First land plants and animals (these would be certain primitive ferns and the precursors of spiders)
- When the dinosaurs lived
- When mankind first appeared
- When the first civilization arose

Guess at a few of them.

I've included them, along with many other events in our planet's history, in our final timeline.

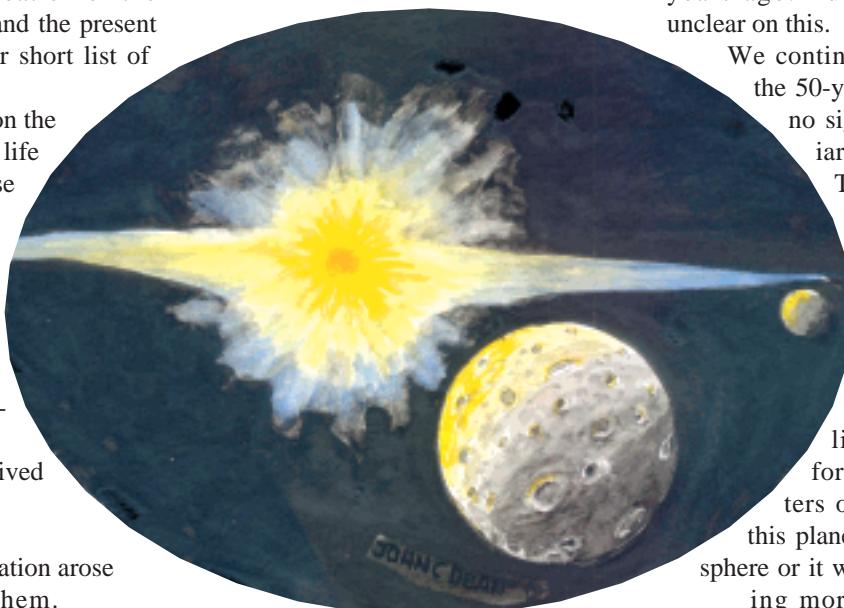
When I first performed this exercise some 20 years ago with a group of very bright elementary schoolers, I got some surprising guesses, and they were surprised when I showed them where each event had to be placed.

Marking our timeline

As we leave the creation of the earth at one goal line and walk toward the other, we are walking through a time when the earth is inhospitable. It is still cooling off from its creation and is suffering from the effects of a collision with a huge astronomical body that formed our moon. Our atmosphere is made up of hydrogen and

FYI: Where would the creation of the universe be on the football field-sized timeline on page 9? With the latest guess of the age of the universe as 12 billion years, it would be about 160 yards behind the goal line we started from.

helium and, over the first few hundred million years (about the first five yards on our football-sized timeline) this is gradually replaced by nitrogen,



A barren, pock-marked earth, devoid of oceans or life, orbits around a sun still forming through the accumulation of cosmic dust 4.6 billion years ago. To the right is the earth's moon, recently formed by earth's collision with a Mars-sized body.

along with methane and carbon dioxide, two gasses that, if present today in the quantities that existed then, would snuff out much of what's alive today.

We keep walking until we've gone a little more than 32 yards to find the

FYI: What was there "before" the universe existed? According to Steven Hawking, perhaps the greatest living physicist, the question has no meaning. "Before" the universe sprung into existence, there was no matter, no space, and no time.

first signs of bacterial life. Look back. We've already gone about one third of the way down the field. Before this the earth was barren, though some biologists contend that the evidence of life that existed 3.1 billion years ago (based on fossil records of bacteria and blue-green algae from the Transvaal in Africa) indicate that life most certainly existed hundreds of millions of years before this. They estimate it began 3.5 to 3.9 billion years ago. But the record is still unclear on this.

We continue walking and pass the 50-yard line. There is still no sign of anything familiar to us on this planet.

There are no birds, no squirrels, no insects, no trees.

We go further and, just about 26 yards from the other goal line, we discover the first cellular life. This means that for the first three quarters of the earth's history this planet was either a barren sphere or it was inhabited by nothing more than bacteria and bacteria-like life. An interstellar visitor who chanced by would not have found our earth a very promising planet.

We may ask why for so much of its history the earth was devoid of higher forms of life. It's true that in the first few hundred million years, the earth was cooling off after its formation. Still, for a billion years after that the planet remained barren and, even after bacterial life finally got a foothold, another two billion years passed before the first life higher than microbes evolved.

There are several theories that try to account for this, among which is the theory that very simple forms of life have difficulty evolving. But a more plausible theory is that global catastrophes, caused by collisions with celes-

tial bodies—asteroids and comets—were more frequent in the past than they are now. Such a cosmic impact is believed by many scientists to have wiped out the dinosaurs, and they may have caused other mass extinctions in our planet's past.

How do we know impacts were more frequent back then? We can see the ancient craters that pockmark the moon, Mercury, and Mars, and we can assume that the earth was hit at least as often as they were. But even though there are remnants of some tremendous impacts on the earth, most of the ancient impact sites have been obliterated by the effects of weathering and plate tectonics over the eons.

From this, some scientists speculate that life probably had several false starts on this planet only to be retarded and even obliterated, again and again, by giant impacts. If even one such event were to occur today, all "higher" life-forms that now exist would simply disappear.

So, let us continue our walk along our football field-sized timeline. We have to walk almost 90 yards—to the distant 10-yard line—before things get interesting. At about the 10½-yard line the first animals with backbones—vertebrates—develop in the sea. From these animals all fish, amphibians, reptiles, dinosaurs, mammals, and even humans will evolve.

Just as we pass over the 10-yard line the very first land plants and animals appear. Among these organisms are ferns and millipedes, and the atmosphere changes to contain 79% nitrogen and 21% oxygen—a "breathable" atmosphere. Land vertebrates and even insects are still in the distant future. This means that for over 90 percent of the earth's history the land was uninhabited, and if a time traveler from today could go into that past he would need a space suit to breath.

True fish appear in the oceans at about the 9-yard line, with sharks appearing 9 inches later.

Soon afterward, on the 8½-yard line, the insects appear. Almost 92 percent

of the earth's history has passed before we see our first bug.

Amphibians, the first land vertebrates, appear about 7¾ yards from the goal line.

One yard later, on the 6½-yard line, reptiles appear.

Dinosaurs appear on the 5-yard line, but they won't last.

Mammals show up on the 4½-yard line.

Birds appear at about the 3⅓-yard line—just 10 feet from the near goal line.

Flowering plants occur about 2¾ yards from the goal line. Would you have expected this: no flowers until 97 percent of earth's history has passed?

On the 1½-yard line the dinosaurs suddenly disappear, likely due to an asteroid impact. They have been earth's most successful "higher" life-forms. While they lived they truly ruled the earth and no mammal larger than a house cat could evolve. The dinosaur's domination of the planet was astounding. Yet, in the blink of an eye, every last one of them was gone. Poof. Only birds, possibly a branch of the dinosaur family, miraculously survived to carry on their line. The dinosaurs' entire existence on our football field-sized timeline was a mere 3½ yards.

We take another step and suddenly things get even more interesting, at least for we humans: ¼-inch from the goal line, the earliest organism scientists regard as human—*homo erectus*—appears. Mankind is a relatively recent arrival.

¼-inch from the goal line one of our "cousins," Neanderthal man, appears. At 1/6-inch *homo sapiens*—that's us, the humans—appears. At about the same time *homo erectus* disappears. 1/40-inch from the goal line, Neanderthal man also mysteriously disappears.

1/200-inch from the goal line, civilization first appears. 1/200-inch is thinner than the piece of paper this article appears on; it's thinner than the period at the end of this sentence. It is so

small when compared to the football field that if instead of using a football field we had made our timeline stretch across the continent, from Boston to Los Angeles, a distance of 2600 miles, all of human history would be in just the last 9/10ths of a mile and only the last 18 feet would represent civilization.

The future

The goal line we are now standing on represents today. What milestones lie ahead and how far does the timeline itself extend?

We know the sun has existed for some 4.6 billion years and scientists expect it to last another 5 billion years or so before it "burns out." In the meantime, every billion years or so (about 22 yards in our model) the sun becomes about 10 percent warmer. Near the end of its life cycle it will begin to expand until it becomes a red giant, and its diameter will increase until it engulfs Mercury and Venus, and it may even expand far enough to swallow up the earth. But long before that, with the increased heat, all life on this planet will have ceased. To include these future events in our model we would have to extend our football field another 120 yards. Barring some unforeseen global catastrophe, that's about how much time this planet has left.

I hope this gives you a feel for just how "large" the history of the earth is. But before I end this, let me tell you a story about the scientist who was lecturing a class of college students on astronomy. During the speech he said, "The sun will burn out in five billion years."

At the conclusion of the speech he opened the floor to questions and a hand at the back of the room shot up. It belonged to a blonde who asked, "When did you say the sun would burn out?"

"In five billion years."

"Whew!" she said relieved. "I thought you said five million years." Δ

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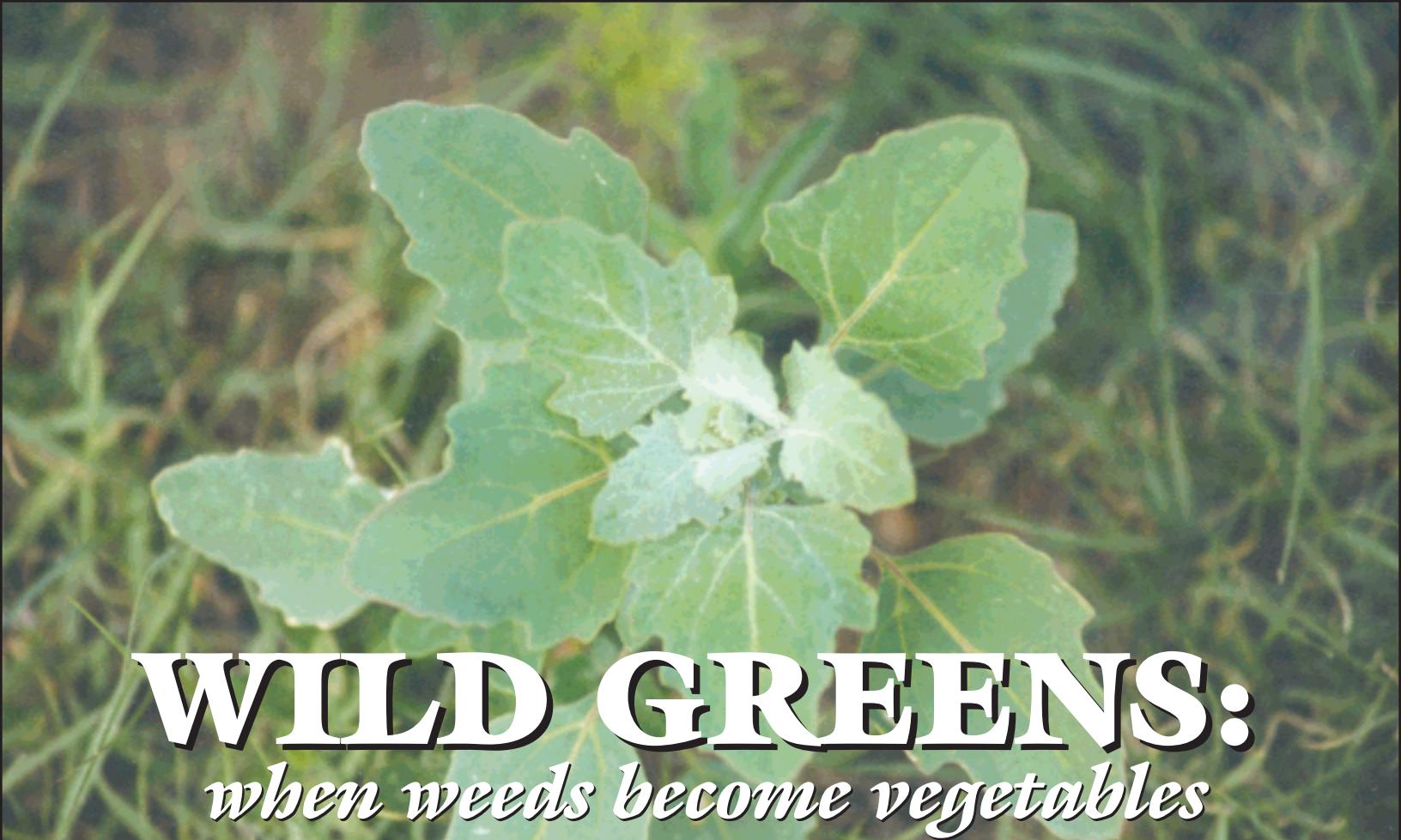
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WILD GREENS:

when weeds become vegetables

By Jackie Clay

We all know there are hundreds of wild greens. We call them “edible” wild plants. But somehow the term edible brings to mind something you only eat in desperate times—survival food that you know must taste bland at best. But the times have gone full circle. This spring I noticed many “weeds” in seed catalogs: amaranth, quilite, milk thistle, burdock, purslane, and more. Suddenly it’s “in” to eat weeds and natural herbs.

It’s funny, our grandmothers happily plucked these same wild foods from the garden (where they appeared as weeds), fence rows, fields, woodlands, and even marshes and used them as table fare. And while I won’t plant weeds in my garden, as they have a way of finding their way there on their own, like my grandmothers I enjoy harvesting Nature’s bounty that grows

“around the edges,” in the pastures, and in other wild places.

There are hundreds of commonly found wild green plants that are good to eat—not merely edible. Why is it that only a few domestic varieties are grown and harvested for most folks’ tables? Beats me.

Where my domestic garden measures about an acre and a half, our wild garden goes on for miles. I not only harvest wild foods, I also process them, canning and drying most of them in abundance, not because I have to but because they actually taste great and are nutritious.

Asparagus

Asparagus is one of those wild-domesticated-gone wild again plants. While it is prized and grown in many gardens, in most areas of the country there are many places where it grows wild in abundance. One field in northern Minnesota was nearly solid asparagus, all 20 acres of it, and only my family wanted to bother picking it.

In at least one valley in Montana it grows thickly along both sides of a minor highway. Here in New Mexico it can be found along the highway to town and in several creekside cow pastures.

It’s everywhere. Seeds are carried by birds and excreted as they fly over pastures or they roost on fences and trees. And as asparagus is very hardy, it soon takes root, growing into a lusty and tasty plant.

Fall is perhaps the easiest time to scout for asparagus. It is during the fall and winter that you can easily spot their beige, fern-like foliage often sporting small round red seeds. Ask friends and neighbors where to find them and often you’ll get helpful tips. Then drive slowly down rural roads, walk along fence rows, and watch for those bushy, ferny plants. Don’t look

Above: Common lamb’s quarters is easy to spot: scalloped oval, pointed leaves. Pick when young and tender.

for the typical plump asparagus tips you see in the supermarket.

When you locate a good patch, be sure the spot does not receive chemical sprays from neighboring fields (a cattle pasture is a good, safe bet), then jot yourself a few notes in a small notebook or tie a small orange plastic tape to a post or woody plant near the asparagus. Remember, in the spring, asparagus hides in the long dead grass beneath the plant until quite tall, so it can be a bit hard to spot in its young, tender stage.

Then in the spring, about the time the grass is beginning to grow, start watching your spot every three days or so. As the asparagus begins to grow, your harvest begins. With a sharp knife, cut off the spears just under the ground. This encourages new growth and will triple the yield you would get if you just cut each spear off a couple inches or more above the ground.

Your patch of asparagus can often be harvested every five days or so. It pays to keep careful track of it as it can grow amazingly fast. Tall asparagus becomes woody near the lower part of the spear. Harvest the entire spear, then cut it off where it becomes tough leaving the woody stem to mulch the plant and mark its location.



Asparagus: Queen of wild greens

Asparagus can be eaten in several ways. Simply washing it, then steaming it until just tender and serving the spears garnished with lemon and dripping with butter makes mouths water. Another favorite of ours is to serve it cut in bite-sized pieces, boiled until just tender, and served in a cream sauce I make by melting a tablespoon of butter in a saucepan, mixing in $\frac{1}{4}$ cup of flour, then slowly adding milk while stirring over a medium heat until I have a medium-thick

sauce. I serve the "creamed asparagus" over crisp toasted slices of homemade bread.

I also can asparagus for winter use by packing the raw asparagus in clean canning jars and adding a teaspoon of salt to each jar along with boiling water to within an inch of the rim. Then I seal the jars with sterilized lids and process them in a pressure canner—30 minutes for pints, 40 minutes for quarts—at 10 pounds of pressure for altitudes of 1,000 ft or lower. (If you live above 1,000 feet, adjust the pressure for any canning recipe according to your canning book.)

Lamb's quarters

In lamb's quarters you have a traditional weed/food. When it pops up in your carrot row, you yank it and feed it to the chickens with muttered curses. But it's actually good to eat. I'm not suggesting that you let it grow in your garden or, worse yet, that you plant it in rows. But if it's in your garden, it's elsewhere close by. I've got a dandy patch between one of my flower beds and the lawn.

Lamb's quarters is common all across North and much of South America. In Mexico it is simply called "quilite," meaning "greens," and it's harvested by the sackful. If you are not familiar with it, ask a few older relatives or neighbors to help you identify this easily recognized green. While it does sometimes grow quite large, you will want to pick it in the spring or summer while it is fairly small (4-12 inches) and tender. Lamb's quarters has smallish, rather triangular leaves with a central cluster where the tiny flowers and, later, the seeds develop. Once you know it, you won't mistake it for anything else.

To harvest and prepare, pick the tender tops and side branches, rinse them well, and steam or boil until just tender. Serve them as a side dish sprinkled with vinegar and chunks of butter. I like to use lambs-quarter in my own creation called homesteader quiche.



David in a bed of lamb's quarters, i.e., pasture.

Put together a single pie crust and, while it's baking, whip up six eggs. (If you take the time to separate the whites and whip until stiff before adding the yolks, your quiche will be much higher.) In a mixing bowl fold in $\frac{1}{2}$ cup cheddar cheese, $\frac{1}{2}$ cup leftover pieces of bacon, ham, or other rather spicy meat, $\frac{1}{4}$ cup chopped raw onions, and $\frac{1}{2}$ cup raw, chopped lamb's quarters. Pour the mixture into baked crust and bake at 375° F. until done.

We also gather basketsfuls of lamb's quarters to can for winter greens. It cans up less mushy than spinach and with a very nice flavor. One of my friends just put up 60 quarts of this delectable green for her family.

For canning, pick, rinse well, and pop into boiling water to wilt. Have your jars, lids, rings, and canner ready. When the greens wilt, dip them out and pack them into either quart or pint jars. Leave $\frac{1}{2}$ -inch head space at the top of the jar. Add 1 teaspoon of salt to quarts, $\frac{1}{2}$ teaspoon to pints. Cover with boiling water, leaving 1 inch of head space. Remove any air bubbles, wipe the jar rims, then put the lids and rings on. Process pints 1 hour and 10 minutes and quarts 90 minutes at 10 pounds pressure.

Pigweed

"Oh my goodness, you eat that?"

Yep we do. And boy, is it good. Now I'm not talking about that tree-like weed after it's grown all summer next to the barn. I'm talking about those nice, tender plants, picked when they're about six- to eight-inches high and snap right off on a cool morning.

You see, pigweed is an amaranth, highly valued in poorer areas of the world as a wonderful green. Many folks have traditionally harvested the seed which is then ground as a flour-substitute and steamed as a gruel. Plains Indians call it "that which pokes the fingers," as the seed coverings are prickly little stickers. While I have harvested the seed, which is quite tiny, we more often harvest



Cholla cactus

the large, succulent leaves and tender stems.

Pigweed is a good spinach substitute and when I canned a batch without marking it and put it on the pantry shelf next to the garden spinach, we could not tell which was which. Not bad for a weed, huh?

Pigweed is a broad-leaved weed that runs rampant if it grows in or near your garden. I've grown several amaranth varieties in my garden but I couldn't see any difference, except in seed production, between plain old red rooted pigweed and "domestic" amaranth.

Pigweed can be eaten in any way you like to use greens. One of our favorites is to use it in a stir-fry. Cut up about 1 cup of fresh or leftover chicken breast into small cubes. Heat a large cast iron frying pan or wok, adding just enough oil to fry. Add the chicken, then $\frac{1}{2}$ cup medium chopped onions, 2 cloves of chopped garlic, 1 medium coarsely grated carrot, 1 sliced bell pepper (red is pretty), and 1 cup coarsely chopped pigweed. Stir-fry, stirring constantly until almost done. Add 1 tablespoon of chunky peanut butter, 2 tablespoons soy sauce, and 1 tablespoon turmeric. You may add a bit of water, if necessary. Serve immediately over rice. The great thing with pigweed stir-fry

(don't actually call it that) is that you can add odds and ends from the garden: snow peas, broccoli, cauliflower, peas, red onions, or whatever, making it different every time.

Like other wild greens, you can home-can it and have delectable greens all winter. Just follow the directions above for lamb's quarters.

Of course, there are dozens of other good wild greens, all basically used like the lamb's quarters and pigweed. They include dandelion, purslane, goosefoot, and orach, just to name a few. But there are other weeds you can prepare differently.

Cattail

Take the common cattail for instance. You all know the cattail, sprouting lustily and abundantly out of many wet areas. Have you tried this versatile plant on your dinner table? While just about the whole plant is edible, I often use the delicate white shoots, just at or below the water line, as a cucumber substitute. After all, who has cucumbers in the garden in April when the cattails begin to grow?

Just make sure you harvest your cattail shoots from water free of runoff containing refuse such as farm chemical run-off, or overflow from a septic system.

Pick those tender white shoots near the bottom of the plant. Peel off any green, tough leaves, then rinse the shoots well at home. I refrigerate them for a couple of hours in water with a little salt. When the shoots are crisp, you may slice them and prepare as cucumbers. They are good eaten with a light vinegar and sugar dressing or great when mixed with a mayonnaise, sour cream, and vinegar dressing in which they are refrigerated for several hours before serving.

Cattail shoots can also be pickled for winter enjoyment using your favorite dill, sweet, bread and butter, or mustard pickle recipe.

Other parts of the cattail plant are also edible. You can dig the roots (kids love this muddy job) which can

be scraped and used as a vegetable in many stews, or you can harvest the pollen and use it in place of flour in most basic recipes. Remember, the pollen is the yellowish dust on the end of the "flower," not the brown, fuzzy cattail.

You can also eat the green cattail before it begins to form seeds. They can be harvested in this tender stage, dipped in a medium batter, and deep fried. Mmm, not bad for weeds.

Cactus

"Oh, no, this time she's gone too far!"

I can hear it now as visions of cactus stickers embedded in lips comes instantly to some folks' minds. But wait! Because cactus grow in a wide variety of locations and states, and because they are so good and versatile, they bear a closer look.

The prickly pear family of cactus is the most common, nationwide-growing "weed" from Michigan, through the Northwest, throughout the West, Southwest and even many areas of the South. Its flat, roundish pads and bright peach and yellow flowers are a common sight.

So, what the heck do you eat on a cactus? The big, tender, new pads in the spring are great. In Mexico and the Southwest they are sold in stores as nopalitos, both fresh and canned.

I harvest the succulent pads with a pair of pliers, dusting off the few thorns with a small, bushy branch and scraping off any tenacious ones with a jackknife. Tender pads may be sliced whole after rinsing and added to any stir-fry or quiche. You can also pickle the sliced pads using any home pickle recipe.

Prickly pear fruits have long been savored by Native Peoples. While they are seedy, they are very sweet and juicy. One of our favorite uses of the fruits (or tunas, as they are called in the Southwest) is making prickly pear jelly. Simply harvest the fruits, de-spining them with a stiff brush and jackknife, then simmer with little water

until very tender. Strain through a jelly bag overnight, then use any mild berry recipe, such as strawberry, and enjoy.

The buds of the cholla cactus are great, too. They may be cooked as a vegetable, after de-spining, of course, and served warm with butter or included, cooked, in a three-bean salad.

Of course many other cactus may be eaten. Check with the local elders for tips on which are best and how they use the harvest.

One added benefit to eating cactus is that they contain complex carbohydrates and are rich in soluble fiber which helps diabetics to control blood sugar. My husband, Bob, is diabetic, so we eat as many cactus products—as well as home-grown and gathered vegetables, especially beans—as possible. Many diabetics

have managed to lower their blood sugar to a point that they no longer need medication, a fact that we feel is significant.

Of course we have just touched on the tip of the iceberg here with this wild foods discussion. There are thousands of edible wild foods: berries, mushrooms, nuts, other vegetable/weeds such as burdock, flower buds, seeds, etc. Once you give wild gathering a try, you'll be hooked, as we are. We now look at all of Nature as our "garden."

And, just as we care for our own garden, we always take great care with our wild plants never to trample, break, over-harvest, infringe on someone else's patch, or otherwise damage our wild garden or our relationship with our neighbors, even if they are miles away. Δ

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Plant your trees *in the spring*

By Tom R. Kovach

Winter is a good time to plan your spring tree plantings, deciding what and where you want to plant. When spring arrives you'll be ready.

Spring is the best time to plant trees because spring planting allows trees to get established earlier, grow more, and do better when hot weather arrives. Spring planting is especially important for bare root stock. Most containerized and container-grown stock, as well as balled and burlapped trees, can be planted throughout the growing season, but benefit from spring plantings.

When transporting trees, protect them from excessive wind, drying, and rough handling. Planting holes should be dug at least two feet wider than the size of the root system. Trees should be planted an inch or so higher than the depth they grew in the container or nursery to allow for settling. Air pockets should be eliminated through watering and tamping after planting. Fill in the hole with a mixture of existing soil and soil amendments such as organic material or loamy top soil.

Fertilizer should not be applied directly to the roots. Wait a year before fertilizing because the trees need to get established first. Cultivate the area four to five feet around the base of a newly planted tree and mulch. Don't put plastic under mulch, and keep the mulch away from the tree trunk.

For bare root and packaged trees, prune damaged roots and spread them evenly before adding soil. Gently raise

the plant to the proper depth as soil is added. When the hole is three-quarters full with soil, fill with water to eliminate air pockets, then add soil before watering again.

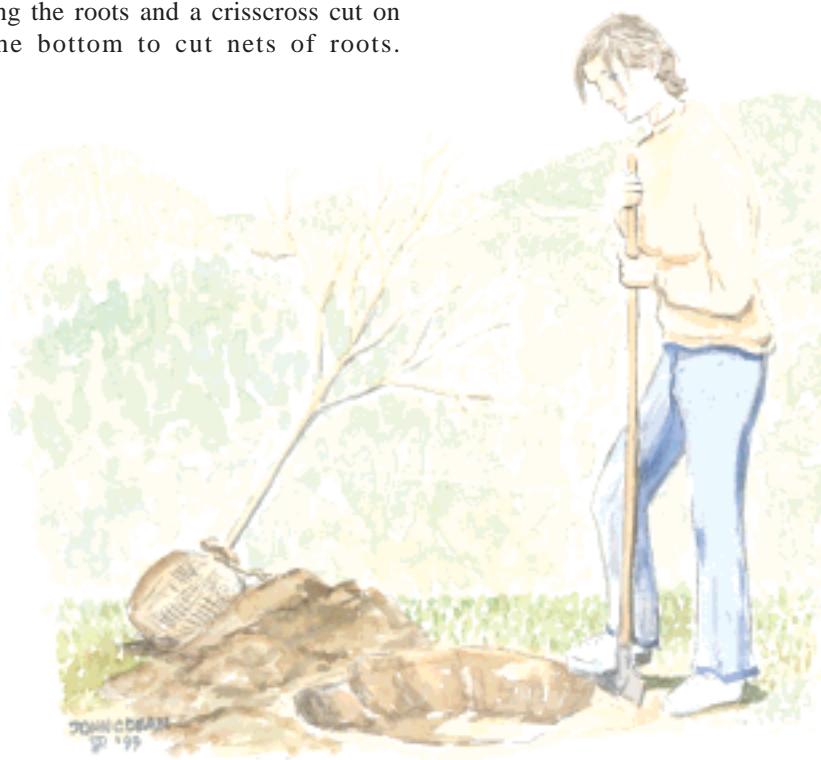
For balled and burlapped trees, lift only by the soil ball and be careful not to loosen it. Remove all twine, pull burlap away from the tree trunk, and make sure no burlap is above the ground after planting. Backfill the hole three-quarters full, saturate the soil ball slowly with water, then finish filling the hole with soil.

For containerized and container-grown trees, remove all containers at the planting site. Treat containerized roots gently. If container-grown roots are growing in a spiral, make vertical cuts on the sides of the soil surrounding the roots and a crisscross cut on the bottom to cut nets of roots.

Plant as you would a balled and burlapped tree.

Trees require a good amount of water during the growing season; water during the summer is critical to tree establishment. Short, frequent watering stunts deep root growth, so a slow trickle of water for hours at the base of a tree works best.

Make sure trees don't get defoliated from insects or diseases during that crucial first year. On smaller trees, caterpillars may be picked off by hand. A good blast with a garden hose will help control aphids or spider mites. Constant care and observation helps assure you of having healthy trees. △



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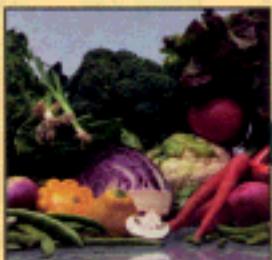
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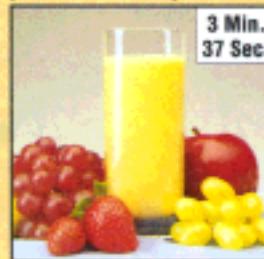
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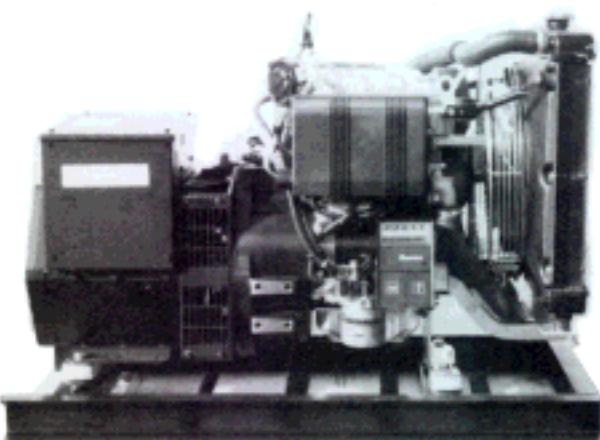
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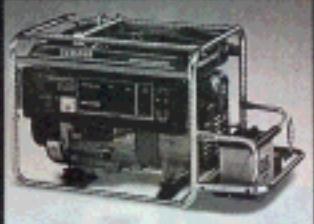
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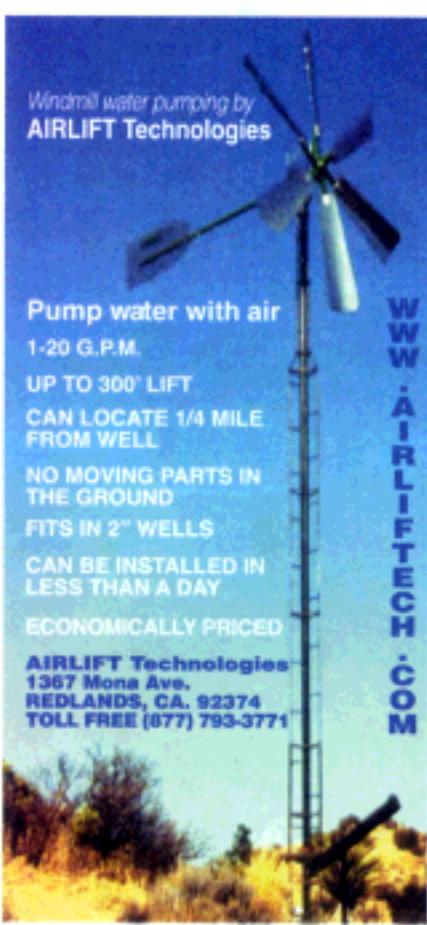
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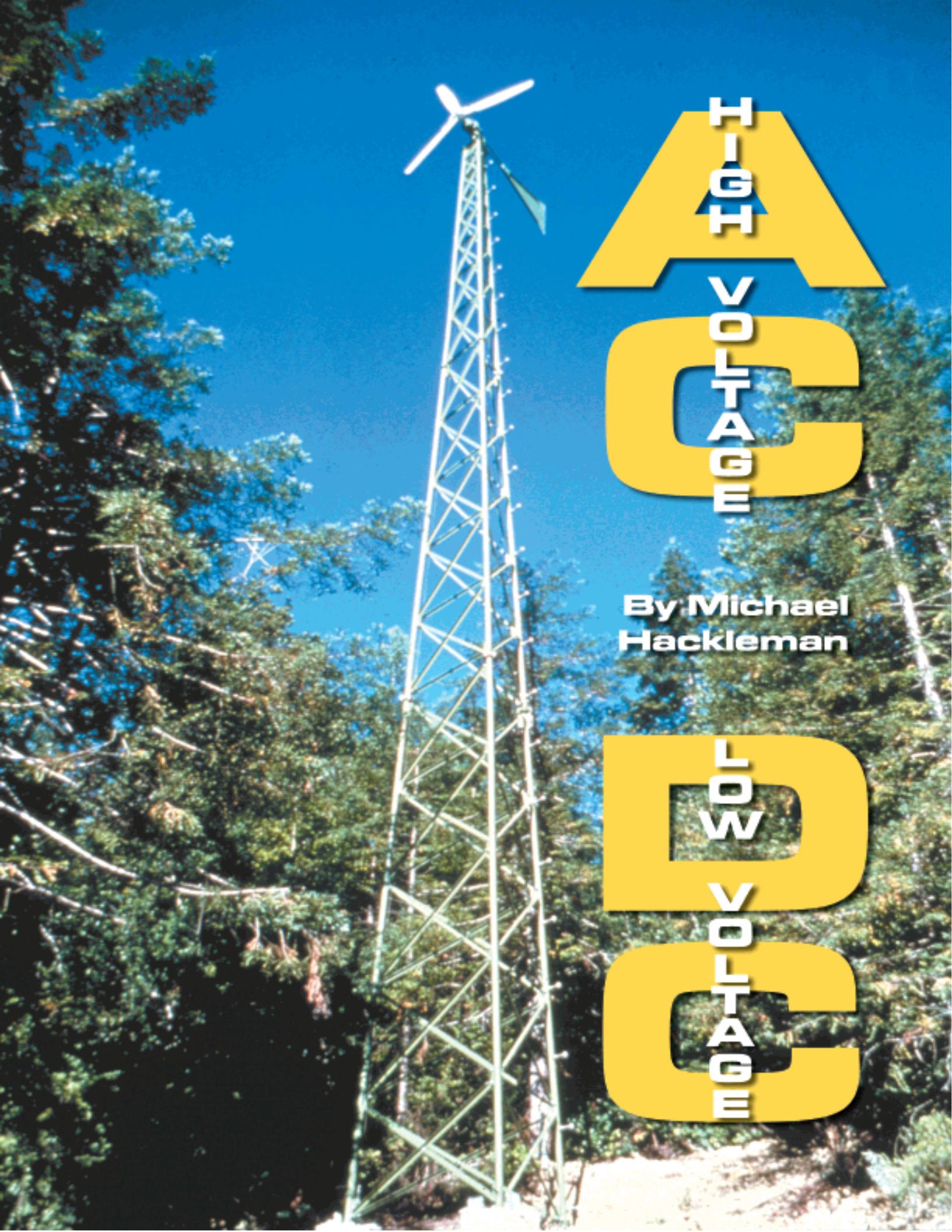
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**By Michael
Hackleman**

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It's refreshing to see the growing popularity of renewable energy (RE) systems—i.e., those tapping the energy of the sun, wind, and water—ranging in size, sophistication, and cost. The hardware in these systems has grown to be widely available, reliable, rugged, and warrantied, and improved in the way it interfaces with utility systems and standby generators. The owners of these systems are generally savvy about their systems and, indeed, may have been involved both in the design and installation.

I find one trend in today's RE systems somewhat alarming: an increasing dependency on 120Vac, 60-cycle output only. Or, more specifically, a decrease in the use of the dc power available directly from battery storage.

The design decision to exclude dc power usage is often rationalized on the basis of costs related to power transmission and system wiring, or siting a standby generator housing. In my opinion, in most cases, this is a mistake.

Before I launch into my 12-point argument in favor of using dc power in conjunction with ac power, let's make certain we're all working on the same page. What is ac? dc? Battery voltage? System voltage? Low vs. high voltage? What factors affect the transmission of power?

ac power

In the USA electrical power supplied by the utility and available at a standard receptacle in a house or shop is 120V, 60 Hz ac. Unabbreviated, this is electricity of 120 Volts (after Volta) potential with an alternating current at a frequency of 60 cycles (or Hz, after Hertz). Hereafter, I'll refer to this AC signal as 120Vac.

If you're under 50 years of age, you've lived with 120Vac all of your life. Most household loads, i.e., lights, refrigerator, motors, appliances, TV, stereos, tools, etc., are rated to work at 120Vac. If you've traveled widely, you know that the voltage available in

Left (Figure 1): A tall tower works both to position the wind-electric machine above surrounding trees and to expose it to the energy of higher windspeeds.

other countries varies (higher and lower than 120 Volts) as does the frequency (i.e., 50 cycles).

This standard of 120Vac is further reflected in the output of generators and inverters. A standby (or auxiliary) generator powered by a gasoline, diesel, or propane-fueled engine is often used in RE systems as a backup source of 120Vac electricity to directly power loads. An inverter is an electronic device designed to make high voltage ac (i.e., 120Vac) from a dc source of electricity, i.e., a battery.

dc power

What is dc? dc is direct current electricity. It's the kind of electricity that flows from a battery. 12Vdc is a standard worldwide. Unabbreviated, this is electricity at 12 Volts of potential and direct current. 12Vdc is a standard used in the electrical systems of automobiles and trucks, RVs (recreational vehicles), and marine applications. Most importantly, 12Vdc is the most common standard for the output of solar-electric (PV) modules, wind-electric machines, and microhydroelectric turbines.

System vs. battery voltage

Don't confuse the electrical standard of the 12Vdc system with that of the 12V battery. By definition, a battery is composed of two or more electrochemical cells. Since one electrochemical cell using lead-acid technol-

ogy can produce a maximum of a little more than two volts (or 2.1V), six cells are combined to produce a 12V battery. In the automobile, the battery and the electrical system are both 12Vdc as a matter of convenience.

However, in golf carts, marine applications, and RE systems the standard battery is three cells, or 6 Volts. To work in a 12Vdc system, two (2) of the 6V batteries are connected in series, adding their voltages together (Fig. 2).

Why not stick with using one 12V battery versus two 6V batteries in a 12Vdc system?

In the automobile, the 12V battery's mission is defined by its type, SLI. SLI stands for "starting-lighting-ignition." Powering the starter motor to fire up the engine requires hundreds of Amps of dc current until the engine starts. The Amp (after Ampere) is a measure of the rate of flow of electrical current. The short duration (seconds?) of this high power level represents a relatively shallow depth of discharge of the battery. This energy is immediately replenished by electricity from the engine-driven alternator, which thereafter handles all 12V electrical loads in the vehicle.

In dc systems, batteries store energy in varying amounts as it is available (from sun, wind, and flowing water) and ladle it out over a period of time. This results in a deeper depth of dis-

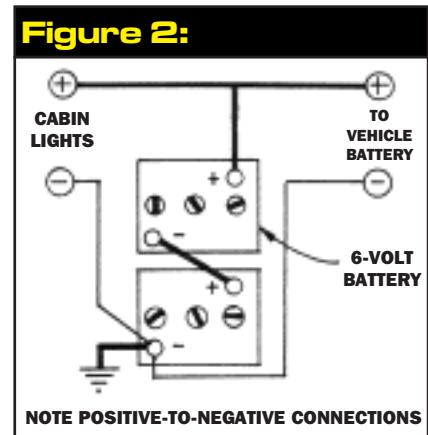


Figure 2:
Series-wired 6V batteries for a 12V system.

charge of the batteries *and* a less-certain time period before recharging is started or completed. The thin plates inside of SLI-type batteries are damaged by the deep discharge and slow recharging in this application. The solution is thicker plates. There is insufficient room for thick plates inside the small case of a 12V battery in a car. However, there is room in the same size of case for three cells of thick plates, or 6V. This explains why manufacturers make a 6V battery.

Fortunately, a thicker plate represents one way to increase ampacity. (Ampacity is one measure of battery capacity, often written as Ampere-hour, or Ah.). Therefore, a 6V, 220Ah battery has roughly the equivalent amount of energy as a 12V, 110Ah. At 65-75 pounds each, this is about as heavy a battery as anyone is likely to be able to load, tote, unload, and position by one's self.

To sum up: The 12V SLI battery has high *power* density and wants immediate replenishment. The 6V deep-cycle battery has high *energy* density and a capacity to withstand repeated deep discharge. *Never use anything less than a deep-cycle battery in an RE system.*

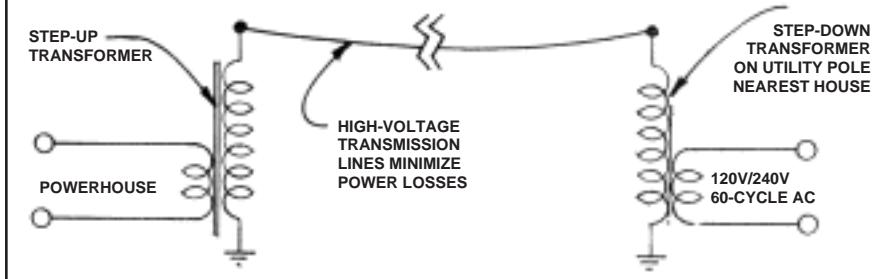
ac vs. dc

To recap, ac (alternating current) is what you get from the standard wall socket and dc (direct current) is what comes out of batteries. Which is better—ac or dc?

dc dominates in the RE system in terms of collecting energy and storing it. Again, the most common standard for the output of photovoltaic (PV) modules, wind-electric machines, and microhydro-electric turbines is 12Vdc. Batteries are a natural for dc systems, too. Batteries won't accept ac—it makes them fume, smoke, and get hot. There is no way to store ac unless it is converted to dc first. With the battery, it is dc in and dc out.

ac dominates in the world of utility-generated power. This is understandable. Without ac electricity, there

Figure 3:



Utilities use AC and high-voltage as a means to deliver power long distances.

would be no way for the utility company to efficiently transfer power from the generating station to your home. In fact, it was the discovery of the ac generator by Nikola Tesla that solved the problem Edison was experiencing in transferring dc power further than a few blocks from the generating station (see **Sidebar A**).

Low vs. high voltage

Another big difference between the standard of 120Vac and the standard of 12Vdc is the difference of voltage itself. The ac standard is nearly 10 times the voltage of the dc one. Why?

Imagine this scene. It's raining, the vehicle's hood is open, and someone has arms, hands, and fingers probing and touching inside the engine compartment.

This is *no* place for high voltage. Even if you're standing in a rain puddle and touching the positive terminal of your 12V battery, it's unlikely you would feel (or be) shocked. Ergo, the beauty of the 12Vdc standard.

The 120Vac in your home is much more deadly. With this voltage, if you touch a bare wire you won't forget it quickly. You will feel a jolt (that's your muscles seizing up) and the jolt will probably kick you off the wire. Fortunately, the advent of strict electrical codes in circuitry and appliances, proper grounding, and the GFI (ground fault interrupt) protection afforded in bathroom, kitchen, and garages—all work to ensure sufficient isolation between you and 120Vac in home and shop.

High voltage is convenient in the home and shop because even for relatively short distances, 120V is more efficient at transferring power than 12V for the same size of wire (see **Fig. 4** and **Sidebar B**).

Line losses are expressed in another way: as voltage "drop." If you notice a lightbulb dim as a motor starts up or a power tool is operated on the same 120Vac circuit, you're witnessing voltage drop. This is analogous to the loss of pressure you might feel in the shower spray as a nearby toilet is flushed.

At 12V, for the same amount of power transfer over the same size of wire, the voltage drop is amplified and the lightbulb will dim to a dull reddish glow. This dimness adversely affects the *frequency* (or quality) of light, whereas a light dimmer switch affects the *quantity* or average current of light. Line losses which are barely noticeable at 120V are intolerable at 12V, and are incapable of adequately operating the load.

In dc circuits of low voltage, the only way to minimize line losses is to use shorter runs of wire. Or wire of a much larger size. Usually it's both—a short run of large wire. Many times, this requires only some forethought and planning since it's usually possible to locate high power dc loads close to the battery bank that feeds them.

Another way to minimize line losses is to convert low voltage dc to 120Vac in the electronic inverter. At \$0.75 to \$1.00 per watt, this is an expensive way to avoid line losses. Still, in RE

Sidebar A: ac vs. dc.

What's this thing about ac anyway? A little history lesson might be in order. It all started when Edison built the first incandescent bulb and the power station to light it.

A big disadvantage of DC electricity immediately revealed itself: you couldn't build the powerhouses any further than a few blocks from where the electricity was produced. Why? The resistance of the wire consumed a portion of the power. Houses close to the power station had brilliant lights and those at the furthestmost reach had dim ones. The last guy on the line had it bad. When someone close to the powerhouse turned on a whole bunch of lights, his would dim even further. And pity the poor farmer! He couldn't get any power out there in the country until a few companies got smart and started manufacturing wind-electric machines.

Then along came Nikola Tesla, the father of ac motors and generators. If you make ac at any voltage, it can be transformed—through use of the highly-efficient transformer—to any other voltage (Fig. 3). Stepping up the voltage has the effect of stepping down the current for the same power transfer.

Why does this matter? Power delivered to the "load" (anything which uses

power) is defined as the product of Amps and Volts, or $P=IV$. On the other hand, line losses (the energy lost in the transmission wires) are determined by the product of Amps squared times ohms (the resistance of the wire), or $P=I^2R$. Note that voltage plays no part in line losses. With ac, then, the transformer stepped up the voltage (or down, depending on the ratio of the number of windings of input and output) to hundreds of thousands of Volts. Naturally, since "power out" must equal "power in" (minus losses), the ac current decreased in the same proportion. Thus, super-high voltage and super-low current meant very low line losses irrespective of how far you needed to send it.

Of course, very high voltage is dangerous stuff for appliances, lights, and

motors. With ac, however, once you get the power to the home, farm, or shop, a second transformer (on the utility pole) would step the voltage back down for use.

The point of this historical review? There's nothing really "sacrosanct" about 120-volt, 60-cycle ac. It is convenient for the utilities to use because it's the only way they have to transfer power over long distances. If your power is homegrown, you don't have their problems, so why necessarily accept their solution? True, after you've considered all the factors, you may decide that high voltage will work best for you in your situation. Fine. Still, explore this topic closely. Low voltage and dc have a lot to offer.

Sidebar B: Low vs. high voltage

Nikola Tesla's invention of the ac generator solved the problem of power transmission through wires over long distances. This also works on a smaller scale in a home. Even the best electrical wire has some resistance to the flow of power. For any given size and length of electrical wire, if you double the current you

send through it, the losses in heating the wire are four times as great.

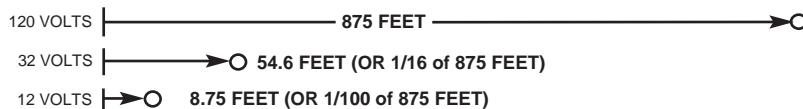
For example, suppose that we wanted to deliver power to a 1,200-watt load. At 120V, this would be 10 Amps. At 12V, it would take 100 Amps to deliver 1,200 Watts of power. The difference in the heating effect of the wire—at ten squared—is 100 times as much for 12V as for 120V.

Increasing the size (gauge) of the electrical wire is one way to decrease this resistance. This is a simple (yet more expensive) way to minimize line losses for a run of even a few hundred feet at 12V. Of course, smaller loads pull less current and suffer less losses even over large distances.

Figure 4:

With #14 WIRE, AN ALLOWABLE 5% LOSS, AND A 240-WATT LOAD

AT: THE DISTANCE OF WIRE CANNOT EXCEED



Line losses are greater with 12V than 120V.

systems that require 120Vac for some loads, an increase in the wattage rating of the inverter might be justified on the basis of the savings in costly runs of larger wire. However, altogether eliminating the use of dc power is taking matters to the extreme.

the ac-only trend

Today's average-to-large RE systems are using two strategies to minimize transmission line losses: greater-than-12V dc energy collection (and storage) and ac-only loads.

a. greater-than-12V dc energy collection (and storage). In this trend, equipment designed to collect energy from solar, wind, and hydro-electric sources and the battery bank are wired to a higher dc voltage. There are many choices of dc system voltage—i.e.,

24V, 32V, 36V, 48V, and 120V. Solar (PV) modules of the same rating may be wired in series to reach any multiple of 12V. The alternators in wind-electric machines or hydro-electric turbines may be re-wired to work at higher voltages or re-wound to produce power at lower RPM. Any of these methods will prove helpful in routing most of the collected power to the batteries.

Conveniently, inverters with these input voltages (24V, 32V, 36V, 48V, and 120V) are available with a fairly wide range of wattage ratings (50-4,000 Watts and higher). Today's inverter—given the good efficiency over its full range of wattage capacity and with energy-saving "sensing" features—is able to help the most remote RE system feel as if it were grid-connected.

b. ac-only loads. Installers, whether independent contractors or the owners themselves, are easily lured into the one-voltage system, i.e., an ac-only system. Sure, a dc voltage is present in the battery room, but it stays there. An ac-only design eliminates the extra dc hardware—i.e., switches, circuit breaker, fuse or distribution boxes, and special outlets—and permits standard wiring (sizes) in the household.

Where the decision to use ac-only electricity is made during a planning stage, another trend is often set in motion. Since it is more efficient to transfer power at 120Vac than at lower voltages (ac or dc), there is the temptation to locate the inverter at some distance from the house in the direction of the biggest energy source. Think about it. Once that 12V, 24V, 32V, 36V, or 48V of generated electricity is converted to 120Vac, the size (gauge) of the transmission line (wire) can be reduced. And, since the battery pack should be located near the inverter it feeds, both battery pack and inverter are located away from the house.

When a standby generator is part of the energy equation, there is additional incentive to build a separate out-

building to house (and quiet) the generator and to locate both battery bank and inverter within it. Combined with the attractiveness of transferring power at 120Vac, this scenario is likely to result in an outbuilding located still further away from house and shop.

An energy system based on this domino-style of planning is flawed. It precludes use of dc in a distant house for transmission loss reasons.

Hybrid ac/dc use

I believe the energy system with the strongest merit is one that fully utilizes 12Vdc *and* 120Vac, as needed. The use of dc and ac together in one system requires some planning (see Sidebar C) and duplicates some circuitry. Still, the two voltages are more complementary with one another than they are contrary.

Altogether, I can offer a dozen reasons why retaining 12Vdc is a worthwhile effort.

1. It's there. The 12Vdc is free. Unused, it's just storage battery voltage. You need only tap it. Using 12Vdc, then, adheres to the KISS principle. That is, keep it simple, silly. Furthermore, any loads that are more easily, efficiently, or inexpensively powered by 12Vdc directly will minimize the list of loads that must be powered at 120Vac. This reduces both the size and cost of inverter required in the RE system.

2. Availability of 12V stuff.

There is widespread availability of appliances, tools, motors, and lights that are designed to run directly on 12Vdc. The RV (recreational vehicle) market is one of the best sources for these loads. Other sources are automotive, marine, and hobby markets. Realize that many RE systems today,

Figure 5:

Amps in Wire	Voltage at 120 Volts	WIRE SIZE									
		#14	#12	#10	#8	#6	#4	#2	1/0	2/0	3/0
1	120	—	—	—	—	—	—	—	—	—	—
2	240	563	875	—	—	—	—	—	—	—	—
4	480	250	438	688	—	—	—	—	—	—	—
6	720	188	300	438	750	—	—	—	—	—	—
8	960	138	213	363	563	888	—	—	—	—	—
10	1,200	113	175	288	450	713	—	—	—	—	—
15	1,800	75.0	113	175	300	475	750	—	—	—	—
20	2,400	50.0	87.5	138	225	363	563	900	—	—	—
25	3,000	45.0	70.0	113	175	288	450	725	—	—	—
30	3,600	37.5	60.0	87.5	150	238	375	600	963	—	—
40	4,800	—	—	70.0	113	175	288	450	725	900	—
50	6,000	—	—	57.5	90.0	138	228	363	575	725	913
Amps in Wire	Voltage at 12 Volts	DISTANCE IN FEET									
		1	2	4	6	8	10	12	15	20	25
1	12	113	175	275	450	710	—	—	—	—	—
2	24	56.3	87.5	138	225	355	576	900	—	—	—
4	48	25.0	43.8	68.8	113	178	288	450	725	900	—
6	72	18.8	30.0	43.8	75.0	119	188	300	481	600	760
8	96	13.8	21.3	36.3	56.3	88.8	144	225	363	450	570
10	120	11.3	17.5	28.8	45.0	71.3	113	180	290	360	457
15	180	7.7	11.3	17.5	30.0	47.5	75.0	120	193	240	304
20	240	5.0	8.8	13.8	22.5	36.3	56.3	90.0	145	180	229
25	300	4.5	7.0	11.3	17.5	28.8	45.0	72.5	115	145	183
30	360	3.8	6.0	8.8	15.0	23.8	37.5	60.0	96.3	120	152
40	480	—	—	7.0	11.3	17.5	28.8	45.0	72.5	90.0	114
50	600	—	—	5.8	9.0	13.8	22.8	36.3	57.5	72.5	91.3

This table allows 5% line loss for 12V and 120V circuits.

Sidebar C: Using ac and dc together

There are a number of issues to using ac and dc together in the same RE system. Briefly, they are: circuit boxes and hardware, outlets, wiring schemes and sizes, and switches.

- Circuit boxes:** The Electrical Code prohibits ac and dc in the same box. You'll need two distribution boxes—one for ac and one for dc. Circuit breakers rated for ac won't work for dc. Expect to pay more for dc breakers. On the other hand, fuses are mostly indifferent to ac or dc, or even differences in voltage. Older-style circuit boxes employing fuses that no longer meet Code for ac wiring will work fine for dc circuits. Up to ratings of 30 Amps, the new style of automotive fuses are also great for dc systems.

- Outlets:** Standard receptacles will work for dc or ac. You must exercise caution in using both in the same household. Plugging a 12Vdc load into a 120Vac socket may fry the load if the circuit breaker/fuse doesn't pop first. Plugging a 120Vac load into a 12Vdc circuit may hurt the load or blow a fuse—or simply do nothing. Still, who needs this worry.

Amateur electricians have many ways to handle this situation. One scheme uses the same type of receptacle for ac and dc circuits but color-codes or labels the receptacle plate itself. This works okay for hermits but it's lousy for guests, children, and the uninformed. A second scheme is to wire ac and dc into the same receptacle, with a shared common (bad idea). Another scheme is to wire the 12V appliances to a unique auto cigarette lighter plug/receptacle (light loads only, please). Or a plug/receptacle of the style found in older RVs (recreational vehicles) for 12V circuits (mostly inadequate).

A better idea is to use a plug/receptacle with a different NEMA number (pattern) for the 12V circuit (shop around for the least expensive type). This usually changes the orientation of

the plug blades so that it's impossible to mix 12Vdc and 120Vac loads and circuits. Add the appropriate plug to each 12V load.

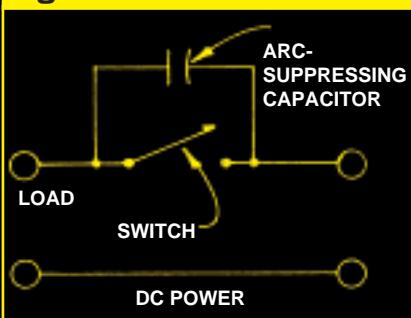
Polarity is another issue with dc. Incandescent lights and simple heating circuits don't really care about polarity, but you must observe proper polarity (pos. or neg.) for LEDs, high-frequency fluorescent lamps, stereos, and many other dc loads. This is easily handled by the newer style of plugs and receptacles that permit insertion in only one way. These will ensure correct polarity in wiring plug and receptacle, as will the use of 3-prong plugs.

- Wiring:** Overall, 12Vdc wiring will require a larger gauge of wire for even modest loads. Wire size increases rapidly with any length. Here, preparation and creativity go a long way toward minimizing the expense and labor while retaining full capability. What do you want to do and where? Special low-voltage wiring tables will assist you in sizing wire for specific loads at varying distances (Fig. 5). There is also merit in the idea of running a branch line of large wire to the far side of the house where it can be distributed from a second, smaller fuse box to loads in that area.

Large-gauge wire is stiff and awkward to route; plan accordingly. Use 12-gauge wire "fingers" from a bigger gauge wire to ease connections to receptacles and switches. Use junction boxes for wire gauges of #8 and larger. Relatively short lengths of #12 wire leading from these to loads and receptacles will incur only small losses.

- Switches:** Switches designed to handle 120Vac may fail in use with 12Vdc. The arc produced when a standard ac lightswitch opens (turns off) a dc circuit will be hotter and last longer. Absolutely avoid "silent" switch types; they open way too slow. Either way, the dc arc will eventually (if not immediately) burn a switch's contacts. It is possible to add a capacitor across the switch to suppress this arc (Fig. 6). Or to wire a

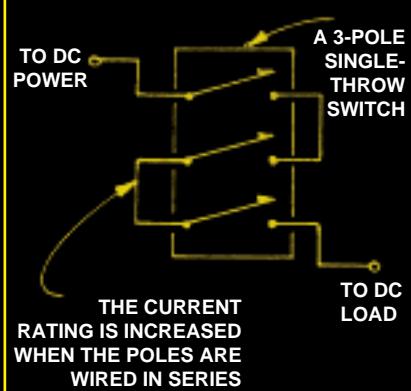
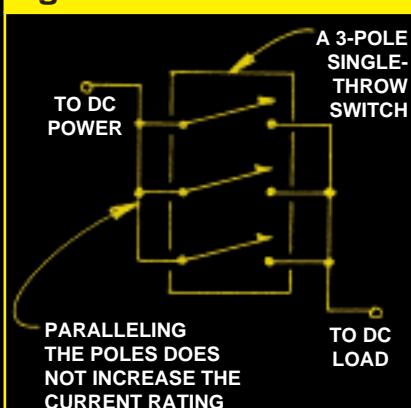
Figure 6:



A capacitor will reduce arcing in a switch in a DC circuit.

switch with multiple poles in series (not parallel; see Fig. 7) to help it survive this arc. Of course, you may also find and install switches rated to switch dc current.

Figure 7:



Series-wiring of multiple-pole switches reduces arcing.

particularly smaller systems, are primarily dc. If there is an inverter, it's a small one that handles only a few ac loads.

3. Reliability. The reliability of any system is no greater than the reliability of its weakest part. Reliability and simplicity go hand in hand. The fewer the parts in a system, the fewer the things that can go wrong. Inverters are expensive, high-tech black boxes containing hundreds of components. The failure of one component will make the inverter inoperative. When inverters fail, they must be shipped off for repair. Are you willing to run a standby generator (if you have one) to power even the smallest loads (i.e., lights) until it's fixed and returned to you weeks later?

4. Lighting. Lighting is one example of loads that are best served by 12Vdc, irrespective of their type—incandescent, fluorescent, or LED.

a. Incandescent bulbs. The filaments of incandescent bulbs are actually being turned on-and-off 120 times per second from 60-cycle ac, 120V electricity. You may not see it but the filament feels this shock. The same bulbs on dc (i.e., at 120V) have a smooth flow of electricity and last 2-3 times longer. Also, a 50-watt incandescent bulb at 120V draws about 0.4A Amps whereas at 12V it draws about 4 Amps. High-current filaments are more efficient than low-current filaments in lower wattages found in households.

b. Fluorescent bulbs. Fluorescents working on 120Vac have a bad reputation, primarily because of the 60Hz (cycle) flicker. Quality fluorescents designed for 12Vdc use higher frequencies (i.e., 5-20kHz) in their circuitry. This eliminates flicker and increases the overall efficiency.

c. LEDs. Light-emitting diodes (LEDs) are super-high efficiency lights that work on low-voltage dc. Four LEDs wired in series with a resistor (to limit current) work directly on 12Vdc (observe polarity). Available in five hues—red, amber,

green, blue, and white—LEDs may be arranged in clusters (in multiples of four) in lamps for reading, spot, and general lighting needs. The new flashlights using LEDs and rechargeable NMH (nickel metal hydride) cells are fantastic. There are no incandescent or fluorescent bulbs that come close to the efficiency, service life, and overall cost-effectiveness of LEDs.

The well-designed lighting system will use a combination of incandescents, fluorescents, and LED lamps. Generally, use incandescents for short-duration and high-illumination tasks, fluorescents for long-duration and medium-illumination, and LEDs for everything else.

5. Toll charges. “Direct use of” electricity, in whatever form (i.e., 12Vdc) is always more efficient than converting it to another form (i.e., 120Vac). Anytime power is converted or transferred, a toll charge is involved. Inverters are most efficient in the mid-to-upper wattage range. Even if 95% efficient at lower wattages, realize that this means that 5% of the energy is lost. This amount equals the acceptable line losses in most household wiring circuits at 120Vac.

6. Duplicity. There are many loads in the home and shop that are powered by 120Vac circuits but they actually operate on low-voltage dc, often 12Vdc. On the inside, then, the 120Vac is stepped down to a lower ac voltage which is then rectified into dc. (Or a black module plugs into the wall and a plug is inserted into the device.) Stereos, many computers, answering machines, and any loads that also may be powered from AA, C, and D batteries are working at 12Vdc or less.

Some loads may be powered directly from a 12Vdc circuit. Use some method of reducing the voltage—i.e., a converter, the selection of a suitable dropping resistor, etc.—for less-than-12V loads. Stereos and computers lacking an external jack may be modified at an electronics (radio/TV/VCR shop) to provide this access (observe

polarity). Is this process worth the effort? There is a certain absurdity to converting 12Vdc to 120Vac in an inverter, then converting the 120Vac back to 12Vdc (or less) for operating a load that, with some forethought, could circumvent these processes.

7. Battery SOC. All batteries are not created equal. Manufacturing variances, electrolyte differences, temperature differences, and battery age—all affect the SOC (state of charge) of a battery in a pack. When a battery pack is wired for voltages of 24Vdc or higher, these variances can only be minimized by periodic “equalizing charges.” This is an eloquent phrase for overcharging the entire pack. To bring the weakest batteries into line means overcharging the best batteries. Conversely, when wired as a 12Vdc system, batteries in the pack receive the charge they need without adversely affecting the others.

8. Load efficiency. There is virtually no incentive in industry to include efficiency as a factor in the design and manufacture of appliances, tools, motors, lights, and electronics that operate from utility-supplied 120Vac. Unfortunately, any inefficiency is too easily hidden in the cost of operating these loads over their service life. Efficiency always adds cost to a product. Thus, the “down side” of competition in the marketplace is that low cost reigns as a design factor over efficiency.

This anomaly was revealed over a six-year period in working with all types of RE systems, where every watt counts. It inspired me to write the book Better Use Of. The power consumption of devices working at 12Vdc sometimes proved less than devices powered at 120Vac, sometimes by a factor or two or more.

Working with ac-only RE systems perpetuates this trend—many of the utility-based 120Vac loads are simply carried over. Even where an effort is made to rid the inventory of superfluous loads, rarely is the efficiency of any specific load analyzed by the

owner. When the system bogs down eventually, the focus is on more energy collectors, more batteries, a bigger inverter, buying a standby generator (or one bigger than the existing one).

In the past two decades, the concept of the negawatt—applied to industrial consumption—clearly illustrates that the best cost/benefit ratio is in conservation rather than more power plants. Increasing generating capacity to compensate for those losses is an expensive option—for the utilities and RE system owners alike.

9. Power vs. voltage. Power production, particularly with today's wind-electric and hydro-electric machines, begins when the generated voltage exceeds battery pack voltage and current begins to flow. Here, the 12Vdc system is better able to take advantage of windspeeds/water flows than higher system voltages (i.e., 24V, 32V, 36V, 48V, etc.) because the generator/turbines must spin to a higher rpm to reach the voltage needed for current to begin flowing.

Admittedly, the real power in wind (more so than water) is in higher windspeeds, and manufacturers must balance many factors to produce a unit that operates over a wide range of conditions. However, without power conditioning (an electronic way of

matching voltages between energy collection and battery pack), it's a simple truth that an alternator or generator cannot reach higher voltages without passing through 12V first. This can make or break an RE system in areas of marginal energy availability.

10. Emergency energy production. One major factor in favor of an RE system based on 12Vdc is that the battery pack may, in an emergency, be recharged from the alternator in a car or truck.

Indeed, many fledgling RE systems have their roots in this method. Like many folks involved in the back-to-the-land movement, I slowly built a house and gardens, developed the water system, and erected a wind machine. My first renewable energy system was a few extra batteries I added to the truck that were charged up whenever we drove this vehicle. Lights, tools, and appliances plugged into this mobile battery pack when I was on the land. If the 12Vdc system's battery pack got too low before I was ready for another trip, I just started the vehicle's engine, set a fast idle, and quickly recharged the batteries.

Once my wind-electric system was online, my battery pack was removed

from the truck and became a stationary one. Rather than buy a standby generator, though, I retained the circuitry in the truck and used it in the winter for recharging my battery pack (via a cord) as needed. It certainly proved quieter than a standby generator. In practice, it proved no less efficient than the small gas engine used in standby generators and losses in the battery charger that converts the 120Vac to dc for storage in the battery pack.

If you don't feel adept at performing the in-vehicle wiring yourself (see **Sidebar D**), get an electrician or a competent auto mechanic to help you.

11. RE system savvy. Most people are interested in what electricity will *do* for them, and are less concerned with *how* it does it. This explains why most people are content to be connected to the utility grid. Or why they will purchase and use an RE system that *feels* like it's connected to the grid no matter how remote their site. Does this type of system offer independence or self-reliance? No—it only changes the source of the dependence. A 120Vac-only system can maintain the same level of ignorance that exists for most utility customers.

One of the merits of dealing with a voltage other than 120Vac is how it

Sidebar D: An emergency 12Vdc charging source

Vehicle (car or truck) alternators are designed to spin fast enough even at curb idle to recharge the vehicle's SLI battery. At fast idle, the charge rate can actually approach the alternator's output (current) rating. For this reason, a vehicle's 12Vdc system will recharge additional batteries, onboard or offboard.

There are two ways to do this. One method merely adds wiring and components to the existing system (**Fig 8** and **Fig 9.**), much like an auxiliary battery in an RV is charged from the engine's alternator. This design also ensures that the SLI battery will start

the engine whenever it's needed. A second method modifies the vehicle's existing charging circuitry to eliminate the vehicle's SLI battery from the circuit during charging to ensure full field current to the alternator and maximum output. This is trickier; get some help.

There are several precautions in using a vehicle as an emergency system for charging a 12Vdc system. First, keep the vehicle's engine hood open to help facilitate the better cooling that the alternator normally gets when the vehicle is driven. At higher outputs, the alternator will get hot. Second, never use the vehicle's SLI

battery for powering a cabin. It won't survive deep cycles *and* you risk a dead battery when you want to start the engine. And, three, ensure that the alternator's field windings never see more than 12Vdc.

With a few additional changes, this setup will also charge battery packs of 24V (or higher). Of course, the engine idle must be advanced further. An alternator is actually capable of producing 120Vdc. Careful. Eddy current losses will result in more heat. Use an ammeter to measure output current and back off from the current rating of the alternator at higher voltage.

challenges an owner to understand it and the entire RE system. For example, the 12Vdc output of most energy collectors (PV modules, wind generators, and microhydro turbines) and loads are rated in Watts and amps, while the capacity of battery packs involves amp-hours. With one voltmeter and ammeter, an owner is able to estimate the day's production of energy (amps times hours), determine

the battery pack's state-of-charge (observe the voltage under load) and easily calculate the effect any load will have on this reserve (amps times hours).

By comparison, 120Vac supplied from the utility will use kWh (kilo-Watt-hour) for the energy consumed and Wattage (Watts) for loads and standby generator output. This requires a kWh meter (complex and expensive) and a conversion process for all of the dc processes involved.

Generally, I have found the owners of RE systems—dc-only (12Vdc) or dc/ac (12Vdc and 120Vac)—to be quite conversant about their systems. I cannot say the same for owners of 120Vac-only systems. The ability to troubleshoot a problem or effectively surmount a shortcoming is directly proportional to one's understanding of the system.

12. dc-to-dc conversion. The cost of the size of wire needed to transfer power at low voltages (i.e., 12Vdc) is offered as a primary justification for 120Vac-only RE systems. However, the same technology that makes today's inverters so efficient is also available in smaller packages to more directly address issues of power transmission.

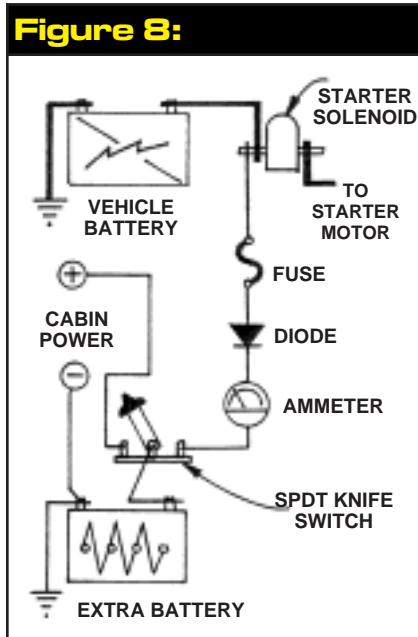
This dc-to-dc technology steps up the low voltage dc output from solar

(PV) modules and wind and micro-hydro generators to a higher dc voltage for transmission to the batteries over smaller, less expensive wires. The voltage is then stepped back down to 12Vdc at the battery pack. This high frequency dc is more efficient than the 60-cycle ac output from an inverter over long distances. This technique is so efficient that utilities are now installing high-voltage dc transmission lines because they are less problematic than ones using ac. Check into this before you commit to a 120Vac-only system.

Final comments

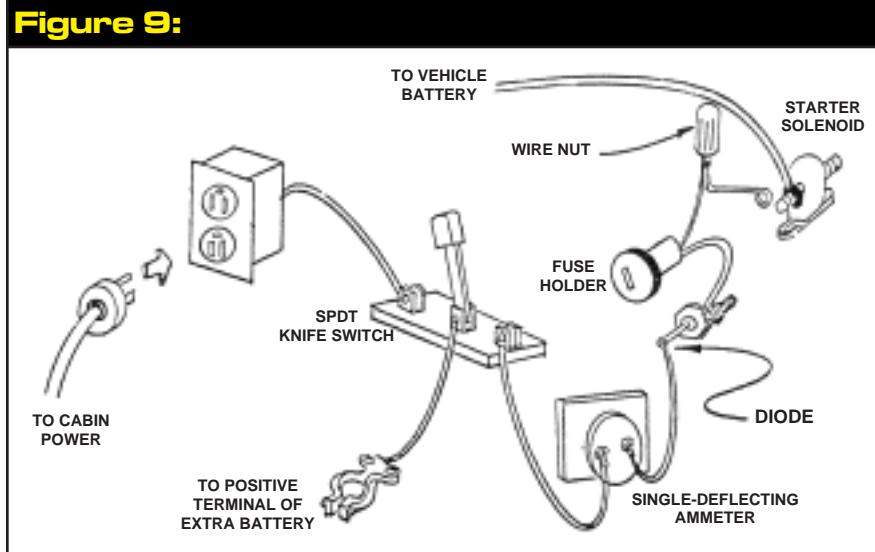
Evaluate your RE system—whether installed, on the drawing board, or still a pipe dream—for the merits afforded in using both low-voltage dc and high-voltage ac. With good planning, downsizing the 120Vac-only side of the system will balance the cost and versatility of retaining a 12Vdc option. Even if it doesn't, consider this saying: The bitterness of low quality is remembered long after the sweetness of low cost is forgotten.

Figure 8:



Schematic for battery charging from a vehicle.

Figure 9:



Wiring diagram for deep-cycle battery charging from vehicle.



Michael Hackleman

(Some drawings and photos in the article were taken from: *At Home with Alternative Energy*, (Michael Hackleman, Peace Press, 1980, pp 147) and *The Homebuilt Wind-Generated Electricity Handbook* (Michael Hackleman, Peace Press, 1975, pp 194). Send an SASE to Michael Hackleman, P.O. Box 327, Willits, CA 95490 for a current publications list. △

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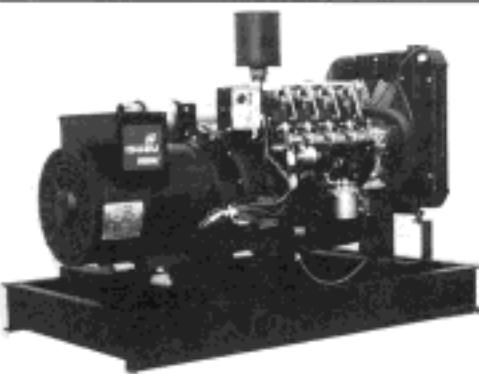
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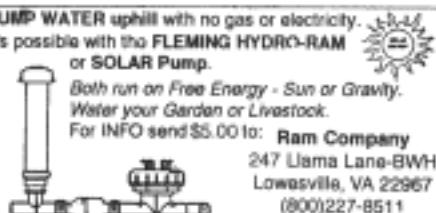
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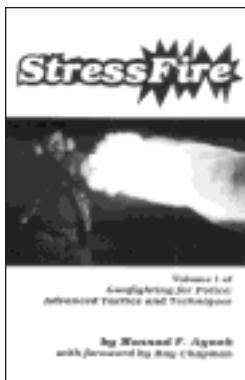
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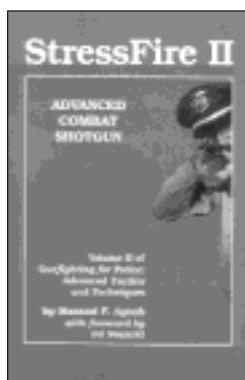
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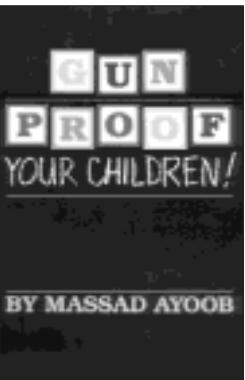
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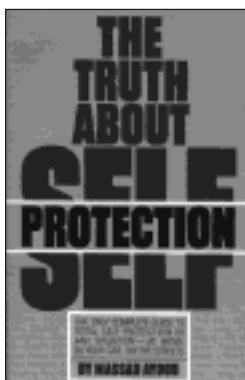
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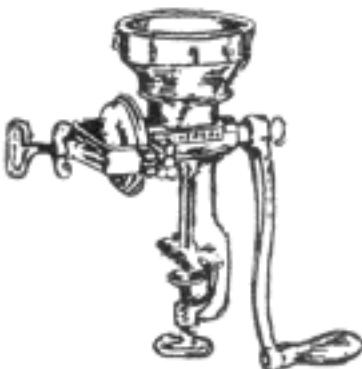
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A portable bench for your better half

By Dana Martin Batory

Considering the high price of lumber nowadays it seems wasteful to throw away any piece of wood—no matter how small. Recently, after completing a 26-foot by 6-foot deck at a lakeside cabin, I wound up with a wide variety of scrap 6" x 5/4" radius edge pressure treated deck board sliding about in the back of the pickup. It's almost impossible to properly dispose of such scraps—they can't be burned, and some landfills won't take them.

How to utilize them was no problem. My sister-in-law had been begging for a stool or bench she could sit on while weeding her wildflower garden, one which would withstand all kinds of weather and damp soil. It was a perfect use for treated or pressurized lumber since it's guaranteed to withstand decay, insects, and fungus attack—forever.

For my plans I turned to a small, yellow pine bench crafted by my Czech grandfather long before the First World War. I concluded if it

could last through nearly 90 years of use and abuse, it had to be well designed.

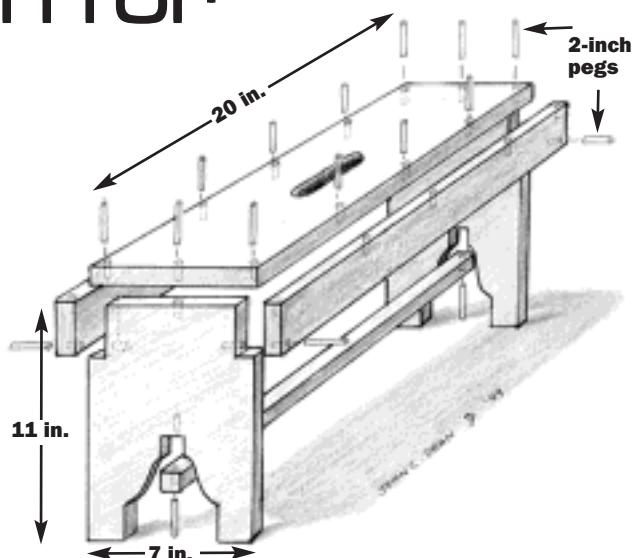
In order to create the bench top and ends, the deck boards have to be edge glued. Ordinary wood glue is not totally waterproof but it will hold the treated boards together long enough to machine them. Given the conditions the bench has to endure, I prefer to use such glues as Contech's PL 500 Deck and Treated Lumber Adhesive.

Establish one straight working edge on each deck board with a tablesaw and/or jointer. However, a careful craftsman can make the entire bench using nothing but hand tools. The idea is to preserve the rounded edges for the outside surfaces.

Saw the scraps in such a way that when glued together you have a board 7 inches wide. Glue and clamp. Saw all parts to size. Lay out and drill a series of 1-inch overlapping holes to

make the hand hold in the top's center. Lay out and cut the joints and curves. I've found a bandsaw is best for cutting all the joints and the scroll work. Lightly sand all pieces and check for fit, correcting where needed.

The original bench was nailed together but I decided to fasten the stool together using 1/4-inch pegs made from the treated lumber. The 2-inch long pegs are made by simply driving small split billets through a 1/4-inch hole drilled through a 1/2-inch thick steel plate. They could also be turned on a lathe or roughly



CUTTING LIST

Top
One 20" L. 7" W. 1" T.

Ends
Two 11" L. 7" W. 1" T.

Side Braces
Two 20" L. 2 7/8" W. 1" T.

Bottom Brace
One 20" L. 1" W. 1" T.

Pegs
Eighteen 1/4" D. 2" L.

whittled to shape with a pocket knife. If you decide to use nails (or screws) use galvanized (stainless steel is better) and pre-drill the holes.

For accuracy I drilled all the holes on my drill press after clamping a 3/4-inch thick piece of plywood to its table to expand the working surface. The parts can be held in position by hand or clamps.

Join bottom brace to ends (one peg at each end). Join side braces to ends (one peg to each lower corner)—position the hole so the peg that will be driven from above will not sever the dowel. Fasten top to frame (three pegs along ends and three pegs along each side). Sand or file pegs flush with surface.

For added beauty or protection the bench can be stained or treated with a preservative such as Thompson's wood protector after it has aged 6 to 12 months. △



This lightweight rugged weatherproof bench is perfect for the ladies to use in outdoor gardening.



Start a self-sufficiency garden even in a cramped apartment

By Nancy Wolcott

You are sitting there in your recliner chair in your small city apartment desperately longing for the day when you can escape to the country and become a homesteader and become more self-sufficient. Well, don't just sit there. Get a head start. Bloom where you are planted until you can actually make the big move. Don't waste valuable time in pointless dreaming. Begin making your dreams a reality, now.

You dream of growing your own fresh, pesticide-free, organic vegetables. So do it. Go dumpster diving and trash mongering and collect all the free containers you can find that will

hold soil and that you can poke a few holes into. Wash and disinfect the containers thoroughly. Then get some potting soil suitable for veggies.

Make your own compost to add to your potting soil in a dark corner (or under the sink) by putting shredded newspaper, kitchen wastes (not meat or grease), and coffee grounds in a large container and adding a few earthworms (which you can either buy or collect for free after a rain at the nearby park). Maybe you can get some leaves and grass for your compost bin at the park too. Keep the composting materials moistened.

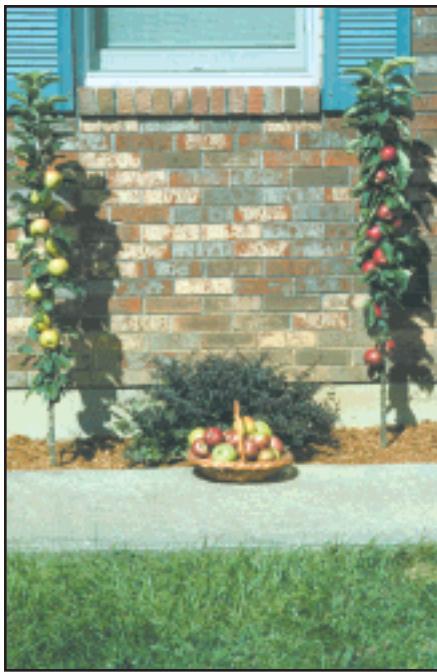
While you are waiting for your earthworms to make the fertilizer, you can order your seeds. Here, I can give you another shortcut. Since I'm stuck in an in-town situation myself at the

moment, I've already done the research to find which vegetables are best for small space and container gardening, and where to get them. Here are a few recommendations to get you started. (Keep in mind that this list is by no means all-inclusive. It is only meant as a suggestion.):

- **Small miracle broccoli**, from Park Seed are little beauties that can be planted as close as eight inches apart so you can fit many in a small space. Broccoli is a heavy feeder so compost well and maybe add a sprinkling of blood meal as a side dressing once or twice during the season.

- **Early sunglo corn** is also from Park Seed. This corn grows on small stalks so they can be planted close

Above: White bloom colonnade apple tree.



All photos courtesy of Park Seed Company

together. Enrich your soil with lots of compost and a sprinkling of bone meal and blood meal. You should then be able to plant the seeds about four to six-inches apart each way. Keep the soil moist, but not soaked. The ears will be small but tasty.

• **Dynamo mini cabbage**, from Johnny's Selected Seeds can also be planted close together like the broccoli. The same planting instructions apply.

• **Kinko mini carrots**, from Johnny's Selected Seeds, grow only four-inches long but you will need a pot at least six-inches or more deep. If you don't have a pot that deep, Bountiful Gardens offers **Parisian rondo heirloom** which is a little, round, bite-sized carrot which doesn't need much space at all. You can plant your carrots two- to three-inches apart each way.

• **Superb super bush container tomatoes**, from Shepherd's Garden

Top Left: Stark colonade apple trees with a basket of apples.

Top Right: Stark colonnade apple tree with a petunia.

Bottom: Stark maypole flowering crab apple and Stark emerald spire.

Seeds, promise to yield abundantly on 2½- to 3-foot space-saving plants. They also boast "firm, juicy fruit with a full tomatoey flavor."

• **Park's creamy hybrid yellow squash** are a straight-necked squash which grows on 18-inch plants. Park Seed also has **green magic II zucchini** which grows on an 18-inch compact plant as well.

• **Sweet pickle peppers**, from Park Seed, are the ones to try for an abundance of sweet salad peppers, although most any pepper can be grown in a pot.

• **Little gem lettuce**, from Park Seed, or **little diamond gem lettuce**, from The Cook's Garden, both produce lovely, tiny, sweet, space-saving heads. Each head makes an individual salad.

• **Pole (green or yellow) beans** of any kind can be grown in a tub. Just make a bean tepee using three or four bamboo poles sunk into the outer edge of the soil in your bean tub. Tie the poles together at the top. Plant four bean seeds around each pole. **Emerite**, from Cook's Garden is an "incredibly productive and easy to grow" green, stringless pole bean which should suit your purpose well.

• **Pronto baby beets**, from The Cook's Garden is a good beet choice for container growing, because they are small. So, you can fit a lot into a small space. They are also reported to be sugar sweet and are said to retain their tenderness as they mature.

• The Cook's Garden is also famous for their lettuce mixtures. They offer **cutting mix lettuces**, **fall mix lettuces**, and **winter mix lettuces**. Plus they offer Cook's **tangy mesclun mix** and Cook's **mild mesclun mix**. Wouldn't Peter Rabbit be in seventh heaven?



Stark Sensation Miniature Peach

- Most types of **radishes** and **scallions** (little green onions) can be grown in pots.

For a container culinary herb garden, Shepherd's Garden Seeds has a **container herb garden** seed collection which includes **piccolo basil**, **dukat dill**, **cilantro**, **French thyme**, **Italian parsley**, **French chives**, plus complete seed starting instructions and a brochure on how to care for and harvest your container herbs.

Shepherd's Seeds also has an **herbal tea collection** which includes lemon balm, cinnamon basil, chamomile, and anise hyssop. These also come complete with instructions from planting to harvest.

So, now that we have your container vegetable garden squared away, let's talk about your balcony orchard. Orchard? No, I'm not crazy.

You don't have to live in the country to produce a substantial amount of fruit. If you have a four-foot by six-foot space, you could produce apples, strawberries, cranberries, blueberries and peaches. I'm not kidding. First, however, check with your landlord to find out how much extra weight your balcony can hold before you purchase any trees. With that information in

hand, now you can choose your combination of trees:

- Stark Brothers Nursery offers **colonade apple trees** which can be planted in containers as small as 17 inches. The trees grow eight-feet tall and two-feet wide and come in five varieties. When mature, they produce an abundance of full-sized, deliciously flavored apples. But, you will need to plant at least two for proper pollination.

- Henry Field's Seed and Nursery will sell you a strawberry tower which takes up only two feet by two feet of space, is on casters for easy moving, and comes in two heights. The two-foot version holds 45 strawberry plants and the four-foot version holds 90. At a recommended 25 plants per person in the household you can do some serious strawberry picking here. By the way, I hear that **Ozark beauty strawberries** grow well in towers.

- Henry Field's also offers a new cascading cranberry which can be grown in hanging baskets. They like acidic soil and don't even mind shade.

- **Dwarf top hat blueberry** plants, again from Henry Field's, grow only two-feet tall, but produce full-sized berries. They are even self-pollinating.

- Finally, Stark Brothers has developed the cutest little peach tree called **Stark sensation**. When it matures, it will produce full-sized fruit but is small enough to be grown in an 18- to 24-inch container. And, if you have a wee bit of extra space, they will sell you a mini apricot and a mini nectarine tree as well.

So, with your vegetables, herbs, and fruits established in pots, your apartment gardens and orchard are all transportable. That means you can take them with you and continue to enjoy a measure of healthy food until you finally make that move to the country and get your full-sized garden and orchard established. Truly the best of both worlds. Δ

SEED SOURCES

Stark Brothers
P.O. Box 10
Louisiana, MO 63353

Johnny's Selected Seeds
Foss Hill Road
Albion, ME 04910

Henry Field's Seed and Nursery Co.
415 North Burnett
Shenandoah, IA 51602

The Cook's Garden
P.O. Box 535
Londonderry, VT 05148

Bountiful Gardens
Ecology Action
5798 Ridgewood Road
Willits, CA 95490

Park Seed
Geo. W. Park Seed Co. Inc.
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The villain *DODDER*

By Alice Brantley Yeager
(Photos by James O. Yeager)

One doesn't go far into the horticultural world without coming to the conclusion that there are certain inhabitants of it that are literally making their way by sponging off of others. (You know—like mooching relatives.) For instance, there's dodder—that leafless, string-like vine that looks harmless

enough draped over some plants in a ditch or hung over bushes in a fence row.

Dodder's botanical name (*Cuscuta gronovii*) honors the Dutch botanist Jan Fredrik Gronovius. Its more matter-of-fact names include Devil's Sewing Thread, Strangle-weed, Devil's Hair, Love-vine, Hellbind and some names not fit for family magazines. The unmentionable names have been bestowed at random due to unpleasant encounters with these parasitic vines.

Like the starling, dodder originated in Europe, came to this country, found it

to its liking and is now found in many areas from the Atlantic to the Pacific coasts. The starling has its good points as a destroyer of many harmful beetles and insects, but we haven't yet found anything positive about dodder.

Despite all the negative publicity, however, dodder has a fascinating side, as it is quite different from what we think of as the ordinary run of plants.

Dodder is one of Nature's bad guys. Just as we humans have the criminal element among us, so does the plant world have its undesirables. If plants weren't attached to the ground, they'd

Left: In a deathlike grip, dodder wraps itself closely around a host plant to draw nourishment.

run when dodder shows up in their neighborhood.

A patch of dodder is easy to identify, as it is quite striking in appearance resembling a quantity of strings lying across the tops of ordinary plants. Dodder has no chlorophyll. It ranges in color from creamy white to yellow to rust. From early summer until frost it is busy producing dense clusters of tiny white or pinkish bell shaped flowers and myriads of seed. Fortunately, it is done in by cold weather, but many of its offspring will be around to begin all over again the next year.

Dodder plants are sneaky. They make an appearance after potential host plants have made a good start in the spring. As the soil warms up in late spring, dodder seedlings emerge. 12-15 hours after they appear, and while still living off of the starch in their seed, young wand-like dodder sprouts zero-in on victim plants. The dodder wands wrap themselves around their victims rarely making more than three turns around any one host branch. The host is then invaded with root-like organs (haustoria) in order to draw nourishment.



Appearing to be a pile of string, dodder looks harmless and gives a spot of color to its surroundings. Try extracting it from its host plants, however, and you'll have a real hassle as dodder clings tightly to its victims with its root-like organs (haustoria).

Within a week after a dodder wand selects a host plant, the dodder plant will sever its own connection with the ground and live entirely off of its many rootholds on its unwilling host(s). The dodder vine will grow and spread upwards tapping into any susceptible plant in order to maintain itself. Efforts

to find the ground roots and pull them up like any other undesirable invader are futile, as dodder no longer needs a connection to the soil to sustain itself. Even if most of the dodder is removed from the host plants, it will continue to thrive as long as a small 'string' is left attached to the host.

I once had a friend, Buna English, who took great pride in growing cockscombs. (*Celosia cristata*). Each year the plants were spectacular with their large red flower heads and she received many compliments on their beauty and healthy appearance. One summer, however, she called me to say, "Something is growing on them!" I dropped by to see the invader expecting to find some kind of fungus. It didn't require much effort on my part to recognize the culprit as dodder. When I explained about the parasitic plant and how it grows, she could hardly believe that such a plant existed and had actually invaded her flower bed. "Heavens to Betsy!"

As it turned out, my friend had bought some barnyard fertilizer to



For the most part, dodder is not choosy about location. Here, it has found fertile growing conditions on a patch of weeds alongside a lake in Ozark, AR.



Dodder soon detaches itself from the soil when it finds itself a host plant. Here, a portion of the twining dodder has been pulled back to show punctures made by dodder's sucking type of "roots."

enrich the soil. Dodder seeds had come free-of-charge with the load of fertilizer. Not only did she have to destroy the affected cockscombs, but dodder continued to come up in the bed the entire summer. It took an additional year to rid the flower bed of it, as, by the time the problem was defined, dodder had dropped plenty of seed assuring a home for its descendants the next year.

Dodder attacks many species of plants. Ornamentals such as petunias, dahlias and chrysanthemum can be victims as well as crops of clover, alfalfa and flax. About the only way to eradicate dodder is to destroy it before its seed have a chance to ripen. Bloom begins in late June or early July—depending on the warmth of the season—and plants produce both flowers and seed until very cool weather

arrives. If a field is heavily infested with dodder, burning is the only sure way to deal with it. Removal from a few flower or vegetable plants in a small garden is not difficult if a gardener moves quickly before dodder has a head start. Remember, if even a portion of the vine is left, this parasite will continue to grow, spread and produce gremlins for next year.

Dodder seeds may come to one's premises in a number of ways. Seed, particularly alfalfa and clover seed, may have been grown where there was an abundance of dodder and the dodder seed harvested along with the other seed. Barnyard fertilizer may contain dodder seed, as in the case of the cockscomb disaster. Dodder likes to live off of well-fed weeds growing around barnyards. Seed may be washed along by heavy rainfall. Inasmuch as dodder has become so widespread, birds are probably a chief means of distribution.

As with all things in the plant and animal kingdoms, dodder does have its enemies. There are at least two kinds of aphids that attack it, but don't go lazy and depend on them to eradicate dodder for you.

Be alert. If you see a harmless-looking mass of strings draped casually on or near plants in your garden, take action to remove every smidgen of the parasite. If plants are already heavily enmeshed with dodder, it may be necessary to pull them up with as little shaking motion as possible to avoid scattering seed. Dispose of them away from the garden

area and DON'T throw them in the compost pile. That would be a sure way to promote dodder.

So, look out for the Villain Dodder. As innocent as it seems, it isn't. △

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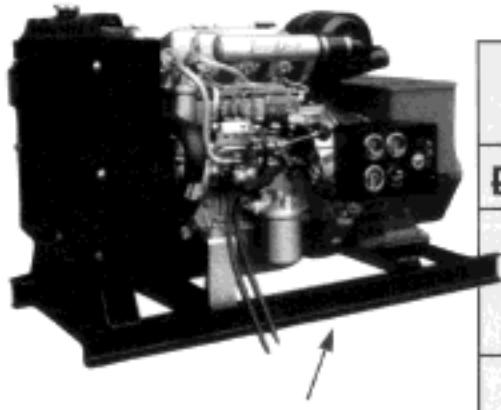
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A YANKEE FATHER REMEMBERED

By Natalie McKnight Haugaard
as told to Kay Haugaard

August 4, 1930 would be seared in my father's memory for that was the day that I, his daughter, was born in a two family home in Milford, Connecticut and my mother, his beautiful, 28-year-old wife, Frances, died. He was devastated and suddenly burdened with raising an infant daughter and five-year-old son. Fortunately, his sister, our Aunt Mollie, was able to care for me while he was at work.

Kenneth McKnight, my father, was born in 1900 in Clinton, where he grew up and finished high school before going to work for a gas company. Later he worked as a cook at a small hotel run by "Uncle Joe" (no relation) in the Adirondacks. He was a tall, lean man of 6'1" with a thick shock of black hair. His quiet, independent character would be strongly tested by his personal tragedy and the upcoming depression. Through it all he remained determined to keep his children and raise them himself.

When I was three, in 1933, he moved us back to Clinton, a small coastal town where he worked as a machinist at the Ponds cosmetic factory. The depression was well underway and for a time we lived with Grandma McKnight. But he soon rented an attractive, little metal clad house in the country and I had the thrill of having my own room.

Dad didn't have a car—not many people did then—and he took his four to five mile walk to and from work every day for granted. Money was extremely tight and he provided most of our meat by hunting in the nearby woods with bows and arrows he made himself. He got the wood from L. L. Bean, then shaped the arrows to suit what he was hunting. The strings were made with filaments that he twisted



Natalie McKnight with her father Kenneth McKnight, in 1931.

together and coated with beeswax. I enjoyed watching the elaborate process of carving, planing, sanding, soaking, bending, and tying the wood to shape into a bow which he finished with glossy varnish. He also fashioned arm and finger guards and quivers with leather. With this equipment he and my brother hunted squirrels, rabbits, pheasant, grouse, ducks, and even deer.

A deer would be hung in our earthen floored cellar to cure. Making good use of his chef's training, he fixed venison roasts and stews. After we had eaten all we could fresh, he canned the rest and made wonderful homemade mince meat. Smaller game like squirrel or rabbit was fried or stewed on the big, black wood-burning range with a warming oven above. He roasted or braised ducks, grouse, and

pheasants. For eggs he kept Rhode Island Red chickens. Occasionally an old laying hen would be fricasseed with dumplings.

I went along when they went fishing although I was too little for a pole and only had a drop line wound over my finger with a hook on the end. It thrilled me whenever I actually caught a little fish. Then Dad explained that it was too small to keep and took the hook out and let it go. Sometimes I got in trouble for trailing my hand in the water as I sat in the rowboat because it tipped off the fish and scared them away. In spite of me, my brother, "Pete," and Dad pulled in plenty fish which we all cleaned and Dad fried golden brown or baked for dinner. Dad also caught eels. I was fascinated by their strange appearance and how the pieces wiggled in the hot frying pan.

Dad also had a large garden with corn, beans, tomatoes, cucumbers, squash, potatoes, onions, and carrots among other things. I did some weeding and gathering but Dad and Pete did most of the work. There were also a couple of apple trees and a raspberry patch already in the yard and in late summer Dad took us to gather wild blueberries.

In frugal Yankee style none of this abundance was wasted. Dad canned tomatoes, green beans, corn, made raspberry and blueberry jam and stored carrots, onions, potatoes, squash, and apples in the cellar. He had a whole repertoire of delicious soups using these ingredients: vegetable, chicken or game soups, great chowders, and a fabulous crab bisque we had in the winter. These were accompanied by his biscuits, cornbread, or gingerbread. We were so self sufficient that about all he bought at the store was flour, sugar, salt, dairy products, coffee, and an occasional condiment or spice.

My father and brother harvested shellfish too and about every six months Dad gave a clambake for my mother's family. Grandpa Williams and Uncle Ev would come from New Britain (Grandma Williams was deceased), Aunt Doris, Uncle Gordon and my cousin Watson came from Milford where Uncle Gordon Goldsmith was editor of *The Milford News*. Uncle Clarence and Aunt Alvina brought cousins, Bob and Ginny. Ginny, my favorite cousin, was seven years older than me and we had great fun.

Preparation for Dad's clambakes was literally from the ground up. First he and Pete caught the crabs and lobster. Then we went to the beach as the tide was going out. I was good at spotting the bubbles from the clams' breathing holes then Dad or Pete dug like crazy with a clamping rake to get the clam before it got away. I wasn't strong enough for that.

Next they dug a deep hole and covered the bottom with seaweed and rocks where Dad built a wood fire. After it burned down to embers he put a thick layer of seaweed over them, then laid the clams, crab, lobster, corn, and potatoes onto it and covered them with seaweed followed by rocks and sand. The whole thing then steamed forever while

Kenneth McKnight's Indian pudding

Ingredients:

3 cups milk	4 tablespoons butter
1/2 cup cornmeal	1 cup raisins
1/2 cup brown sugar	1/2 cup dark molasses
4 eggs well beaten	1/2 teaspoon ginger
1/2 teaspoon cinnamon	1/2 teaspoon mace
1/4 teaspoon salt	

Method:

Grease a 2-quart baking pan or bowl. Scald milk in the top of a double boiler, and gradually beat in the cornmeal. Cook over hot water until slightly thickened. Remove from stove and add remaining ingredients, beating well after each addition. Pour into baking dish and bake at 300° for about 2 hours. Serve with whipped cream.

everyone got hungrier and hungrier. Some of the adults went swimming and we kids investigated tide pools among the rushes, gathered shells, dug in the sand, and played tag. When finally it was time to eat, the blended aromatic perfume of seafoods and vegetables was practically a meal by itself. A little melted butter made the feast ambrosia. After stuffing ourselves we had enough energy to make sand castles while the adults caught up on family news.

We were so far from town there were no other children to play with out of school so we became self-sufficient about entertainment.

Before I was school-age a neighbor lady looked after me until my brother came home. Sometimes she'd say, "Natalie, could you straighten this cupboard for me?" While doing it I usually found a couple of small coins which I would take to her. She'd smile and give them to me for doing such a good job. As an adult I realize that she planted the coins to test my honesty and also provide a little treat for me.

When Pete got home we played dominos, rummy, Chinese checkers, built things with toothpicks, read books or played pretend-like. I had a couple of imaginary friends who were a lot of fun, and an old piece of cloth could transform me into a princess or an angel. I wasn't lonely, although after I started school I wanted to have a mother like the other kids. We didn't have a school bus and we walked several miles to and from school. On Sundays Dad and we kids walked into town to church too.

In the winter we went sledding, ice skating, and built snowmen. In the summertime the town had a "Kids Day" parade. All costumes, carts, wagons, or bike decorations had to be done by the kids. Pete and I took first prize one year.

One summer, when Pete was about thirteen and I was eight, he did odd jobs at a one-plane airport in order to get

plane rides for him and me. It was wonderful until Dad found out.

With Dad we took walks in the country and looked for Indian artifacts in plowed fields. He accumulated a large collection of arrowheads. We had a radio but didn't use it much because there was so much to do. I enjoyed being in the kitchen when Dad cooked. I'd talk to him and set the table and do little things to help. Then we'd all say grace and sit down and eat together. We had a piano and in the evening sometimes Dad played Irish tunes and we sang. He was also a fantastic banjo player and read to us also. I especially remember Northwest Passage. Sometimes he would come in and listen to me say my prayers and remind me that God was watching over me and I should always be good so as not to displease him.

Saturday was marketing day and we'd walk to town and carry back the groceries. Sometimes, on the weekend, Dad would pack a lunch and take the rowboat to an island for a picnic and fishing.

As I got bigger I helped more. At seven I stood on a box and Dad showed me how to iron. I started with simple, flat things like handkerchiefs and pillowcases and worked up to shirts and dresses. I also started helping with the laundry which Dad did at a scrub board in a galvanized tub. I felt so proud and important to be able to help and please him.

In 1937 there was a terrible hurricane in the middle of the day while Dad was at work. The wind roared around our house and really large trees crashed near us like the toothpicks we played with. I was terrified that they might crush our house. My brother and I got under a table like we had been told and played dominos. It was hard to concentrate while the wind howled like a giant beast trying to tear apart our house. The gale roared on and on almost forever. We didn't have a phone and Dad must have been as worried as we were. When the wind died down our house was intact but we soon found ourselves in the dark with no electricity. Because of the storm Dad didn't get home until late. There he found us with candles lit and my brother reading a book to me. Pete had been a wonderfully calming influence, but suddenly to see Dad made me feel completely safe again. I ran to him eagerly for an especially strong hug and kiss.

One thing we didn't have was new clothes. Once in a while a relative brought a box of hand-me-downs from various cousins and about once every four or five months the "County lady" came by with a box of old clothes. I jumped with joy when I saw her and eagerly rummaged through the box to pick out the girl things. They were usually two sizes too large but I put them on and pranced around proudly.

But Dad always made a wonderful Christmas for the three of us. There were no decorations around the house before Christmas. On Christmas Eve Pete and I hung up our stockings. I carefully got out a clean, long one without holes so it would hold more. Dad read us the story of Christmas from the Bible and after a nightcap of hot chocolate, we went to

bed excitedly anticipating Santa Claus's arrival. When we woke up on Christmas morning there was a most glorious, magical tree in the living room lavishly bedecked with popcorn, cranberry chains, apples, and real store-bought ornaments with a perfectly heavenly angel on top. Santa Claus had not failed us and the whole house smelled spicy from Dad's Indian pudding baking. It was made of cornmeal, milk, and molasses richly scented and flavored with spices and raisins. It was quite firm, and the following day Dad sliced the leftovers and fried them for breakfast.

Of course we each got a present, and how they were invested with magnificence by my mind. Jacks for me, marbles for my brother, a homemade jump rope for me and a harmonica for Peter. There were colorful knitted stocking caps, mittens or gloves, and, once, a marvelous pair of shoes for me. I like to imagine they were patent leather with straps but actually they were brand new, sturdy, brown oxfords for school. How beautiful I felt when I put them on and walked around staring at my feet as if entranced.

Christmas dinner was duck, roast chicken, or turkey with side dishes from home-preserved vegetables and fruits. For dessert we had Dad's delicious apple and mince meat pies.

When I was ten we moved away from the little metal house to New Britain to share a three-story house with Aunt Alvina whose husband, Uncle Clarence, (my mother's brother) had died some time before. We lived in the upstairs and Aunt Alvina and our cousins lived in the bottom two floors. My father got a better job as a machinist at Faffners, a ball-bearing manufacturing company. When I was twelve Daddy married Aunt Alvina. I was thrilled to have a mother like the other kids and it was even better that it was Aunt Alvina whom I already knew and loved.

It was the beginning of an easier life for our father but I will always cherish those years of closeness to the earth and my father. By society's standards I guess we were poor. I wasn't aware of it as a child and now that I am an adult I realize that actually we were very rich indeed. △

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Keeping Poison Ivy under control

By George Griebe

"Leaves are three, let it be."

I was taught this while I was still wearing (cloth) diapers. Even if you are among the minority who, like me, have never had an allergic reaction to urushiol, the active ingredient in sap from poison ivy, poison oak, poison sumac or the mango family (pistachio and cashew nut), you may want to keep poison ivy under control on your property.

You may have visitors to your homestead who are sensitive. Or you may not want to risk having it show up in the milk after your cow or goat has eaten the leaves. Your pet can get the sap oil on its fur and give a case of poison ivy to whomever touches it. Your level of sensitivity varies from day to day and generally decreases with age. About 85% of children are sensitive but only about 50% of adults are sensitive. Only 10 to 15 percent of the population is truly immune.

Do not burn poison ivy

The urushiol oil in the sap does not lose its allergy triggering property easily. If you burn the plants, the oil will vaporize and condense out of the smoke onto everything and everyone. Worse yet, someone may inhale the droplets of oil in the smoke and get a reaction in the throat or lungs. Plants that have been dead for years still contain the oil. A piece of firewood several years old with a vine attached will cause an allergic reaction to someone sensitive.

The best time to control poison ivy is in the spring. It leafs out earlier than many plants and the young leaves

seem to absorb a chemical brush killer more readily. The new leaves are usually reddish in color. If you do not think that you can readily identify the plant, get several plant books from the library, or go to the internet sites listed in the box, and spend time studying the photographs. Blackberry leaves look similar, as do several other plants including clover, strawberry, and raspberry.

Poison Ivy can be killed by repeated mowing. But be careful; I would not recommend using a weed whacker on it. You can suffocate the plant by covering it with newspapers held down by wood chips, or by covering it with two layers of clear plastic, thus cooking the plant and the ground around it.

Poison ivy spreads by underground roots which may pop up several feet from the plant you have identified. Without use of chemicals, poison ivy is difficult to control. The best chemical to use, if you can get it, is Agent Orange or 2,4,5 T. I have had good luck with glyphosate (Roundup) also.

If you have more than one plant, then you or a neighbor has a seed-producing bush or vine. You have to find the "mother tree" where the seeds are

coming from. It will likely be a large vine growing up a dead tree. The tree may have so many poison ivy leaves on it that it appears to be an ordinary tree. Usually the vine will have many fine hairs coming out both sides which very firmly attach the vine to the tree trunk. You will know that you are getting close to the "mother tree" when you find many small "leaves are three" plants covering the ground. Note that the vine may be very large and shiny looking with no hairs on it if the vine is very old. It took me 20 years to find one very large vine up a tree which was smooth and bigger than my arm and no longer attached to the tree trunk.

I use a pole saw to cut the vine. I cut out about a 6-inch gap in the vine about 18 inches from the ground. The cut end of the vine is then sprayed with brush killer which travels down to the roots. I use this pole saw for no other purpose and I am careful where I store it. The saw blade is covered with urushiol sap. If it ever needs sharpening, I shall buy a new one instead. If the vine sprouts below my cut, I spray the sprouts with brush killer.

Poison Ivy **INTERNET** Sites:

If you have Internet access, help identifying is available at:

<http://www.sparks.org/pma/ivyphoto.htm>

<http://www.conservation.state.mo.us/nathis/flora/poivy/poivy.html>

<http://www.library.uiuc.edu/vex/toxic/pivy/pivy.htm>

You may instead have a poison ivy bush which has gotten big enough to flower and produce berries. It may be 15 feet tall. Cut the plant just below the green or white berry cluster using the pruner cutter on your pole saw and spray brush killer on the remaining plant leaves. This will save you from having to deal with a few hundred more plants grown from the seeds in those white berries.

If a robin has planted an unwelcome three-leaved plant in your flower garden, you might not want to kill it by spraying it. My mother had a solution to this problem: she would put a folded newspaper over the plant, then grip it through the paper and pull it up roots and all. An improvement on this technique is to first water the plant to soften up the dirt around the roots. Then, instead of using a newspaper, put a paper bag inside a plastic bag. Invert the bag assembly over the plant and then grip the plant through both the plastic and paper bags and pull up the plant taking the roots with it. Do not burn the plant and do not put it in the compost pile. I would suggest burying the plant at least two feet deep while still in the bags.

If you have searched all summer for the mother tree, then fall will bring you another chance of success. Much of the pretty fall color in the woods is from poison ivy leaves changing color before the other leaves change. Check the tree trunks for vines on the trees which have a streak of dark red and bright orange color going from top to bottom.

First aid

If you are unlucky enough to be exposed to the sap, there are some things you can do. Carefully take off your clothes as soon as possible and

wash them separately. The sap will stay on the clothes for years unless it is washed off. You may have to wash them more than once. Be careful about how you handle the contaminated clothing.

If the sap is on your skin, the American Academy of Dermatology recommends washing with only cold water and no soap. My preference is to use a good grease cutting soap with cold water. When I was a child, I went on a group nature hike through a swamp. We mostly walked on logs and held onto poison sumac branches to keep our balance. When we left the swamp two hours later, our hands glistered with oil. The guide, who had warned us to keep our hands away from our faces, had each of us wash under a pitcher pump while he pumped cold water. He supplied a yellow bar of Fels-Naptha soap. No one in the group developed a rash during the next week. Jewel weed has been recommended for years as treatment. Recently, manganese sulfate has been recommended to neutralize the urushiol.

If you get a reaction, then you need to see your doctor. If you have a rash or blisters, you cannot give poison ivy to another person even if that person is exposed to fluid from the blisters. Only residual urushiol oil on your skin can sensitize another person. The reaction will usually begin in one to ten days and last for two weeks.

Over-the-counter hydrocortisone creams are usually too weak to totally combat the itch or control the reaction. If you scratch the area, you may get a secondary infection. Prescription corticosteroid drugs can halt the reaction if taken soon enough, so do not delay seeing a doctor. Δ



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Preparation for successful painting

By Oliver Del Signore

Producing a professional looking paint job is not an especially difficult undertaking, but it does require a bit of extra work beyond just slapping the paint on the walls and woodwork. The two keys to making a room, a house, or any painted object look great are proper preparation and good tools.

Tools

The biggest mistake first time painters make is to cut corners on the tools and paint. It is understandable they might choose a five dollar brush over its fifteen dollar cousin since they look similar to the untrained eye. And that pack of six roller covers for five bucks is a heck of a bargain com-

pared to the individually wrapped ones at two-fifty to four dollars each. And the paint...why spend twenty-five dollars for a gallon when there is a brand which costs only fourteen? The answer, in a word, is quality.

Brushes

A close inspection of the two brushes will reveal some important differences. If you look at the ends of the bristles on brushes meant for latex paint, you will notice the cheap one looks and feels different than the expensive one. The bristles are probably cut square and are all the same length on the five dollar brush, while on the expensive one they are tapered and often suffer from "split ends" (**Fig 1**). It is the angle of the cut and the split-ends that allow the brush to hold more paint and to apply it quickly, easily, and smoothly, without leaving streaks. Properly cared for, a top quality paint brush can last for many years, through many jobs, and will pay for itself many times over.

Once you've decided to buy the best quality brush, you have to choose the type and size. There are two main types: the wall brush, which is cut square, and the sash brush, which is cut at an angle (**Fig 2**). I use a sash brush for everything, which saves having to buy two brushes. The angle and point allow me to more easily paint corners and edges. It also does just as good a job as a wall brush on flat surfaces.

The size you choose will depend on the job and your skill level. Brushes come in a variety of sizes, the most popular ranging from one inch to three inches in half-inch increments. Since the smaller sizes are easier to handle, if you are a beginner I would suggest

Figure 1:

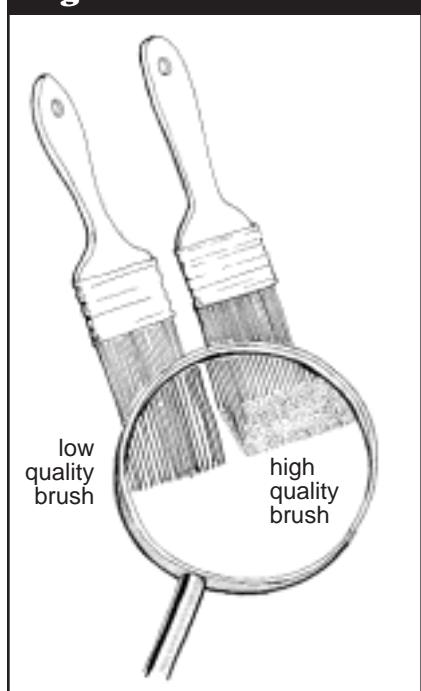
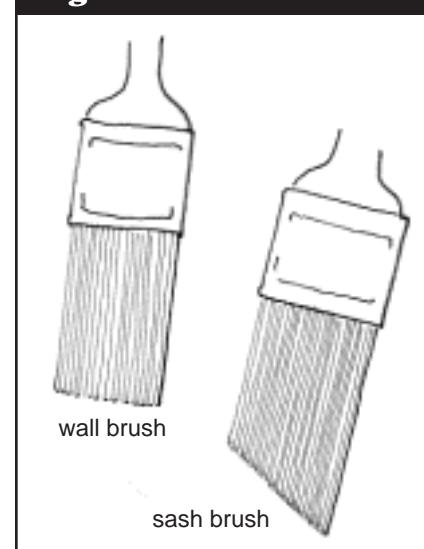


Figure 2:



a 1½-inch brush for "cutting in" edges and a 2-inch or 2½-inch for wide surfaces. As you become more skilled at handling a brush, you'll find you will be able to edge and do window sashes with wider brushes, which allow you to apply more paint more quickly. I generally use a 2½-inch brush for everything except fine detail work.

Roller covers

While the inexpensive multi-pack roller covers will get the paint on the wall, the more expensive covers will, like the better quality brushes, hold more paint and allow you to apply it, and finish it, more easily.

The nap—the fibers or threads—on better quality covers is much more dense than on the cheap ones. Some inexpensive covers are so poor you can actually see the cardboard tube through the threads. In addition, cheap covers are much more likely to "shed" as you are using them. When a roller cover "sheds," the fibers come loose and end up on the painted surface.

Since good covers cost only a few dollars more, why chance having a job ruined by a cheaper quality product?

Choosing the proper nap length is just as important to the finished product as is the quality. A $\frac{1}{4}$ -inch nap is generally used for oil or latex paints on ultra-smooth surfaces. A $\frac{3}{8}$ -inch is a good choice for latex on smooth walls and ceilings, while $\frac{1}{2}$ -inch and $\frac{5}{8}$ -inch are good for rougher surfaces like scrolled or "popcorn" ceilings and for some masonry. The thickest naps, $\frac{3}{4}$ -inch and 1-inch, are used for very rough or deeply pitted surfaces.

Hint: If your job is large enough that you won't finish it in one day, you can "store" the roller overnight by leaving it on the handle, loading it heavily with paint, and then wrapping it securely in plastic so no air can get in.

The paint

Any good cook knows that the best ingredients produce the best meal. It is not much different with paint. Most paint manufacturers make several "lines" or grades of paint. In general, the differences will be in the amount and/or type of resin, pigment, and solids in the paint. Naturally, the more and the better the ingredients, the higher the cost. Too often, a lesser grade is harder to apply and not as durable. That is why I always choose a manufacturer's best grade of paint.

Primer

Primer is a type of paint that seals the surface to give a more uniform looking finish when the topcoat is applied. It is used over bare or freshly sanded wood and over bare plaster or drywall. Some formulations can be

applied over old glossy or semi-gloss paint instead of having to sand the surface, while others are good for sealing in stains and wood knots so they will not "bleed" through the topcoat. Primer can also be used when there will be a drastic color change, such as yellow over dark red or blue, or vice-versa.

Preparation

The surface to be painted must be clean and dry, free of oils and waxes and in good, sound condition. If you will be painting over a new surface, preparation will likely be limited to wiping it down with a dry cloth to remove any lingering dust.

Older, and previously painted, surfaces are another matter. The first step is to check for and scrape off any loose or peeling paint. If there are any areas you are unsure of, scrape them anyway. It is better to have scraped a bit too much than not enough because your paint job will only be as good as the underlying surface. While you are doing this, especially if you are painting indoors, you will want to check for and remove any bits of tape and the like which are stuck to the surfaces.

The next step is one many people, even professionals, neglect because it takes a lot of time.

Look at a spot you just scraped, and you will notice the sharp, "square" edges between the top layer and whatever is underneath (**Fig. 3**). If there were several layers of paint already on the surface, you might notice how the layers step down. Painting right over those will result in a ragged looking finish because the paint will follow the contour of the sharp edges and valleys. To prevent, or minimize, that effect you need to feather the edges by sanding them until they slope down rather than step down between layers. This will allow the new paint to flow smoothly from one layer to the next, resulting in a much smoother looking finish.

Your next task is to locate and fill any holes, gouges, and cracks. There are many products you can use to fill them. Some products require you to slightly overfill because the product shrinks as it dries. It is always best to read all the directions before choosing and using any product. When the fills are dry, sand them lightly until they are even with the surrounding surface.

It's now time to sand all the rest of the surfaces to be painted. While this is less important if the old paint is a flat finish, it is essential if the existing paint has any kind of gloss, unless you will be applying one of the special primers designed to bond to glossy surfaces. Even then, if the old paint was a high gloss finish, I like to sand a bit to break the gloss and help the primer stick even better.

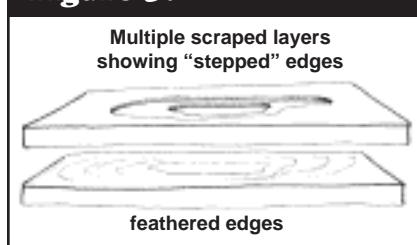
After the sanding is done, vacuum the surfaces and the floors to remove the sanding dust. You can also simply wipe them down with a dry cloth, although you must make sure to get all of the dust off the surface.

The final step is to wash all the surfaces down with a good no-rinse cleaning solution. If there was any mold or mildew present, you should choose a product to which you can add bleach according to the directions on the bleach container. However, if you use bleach you **must** rinse thoroughly with clean clear water. If you do not, the paint will not stick properly.

Caution: Never add bleach to any solution containing ammonia as it will produce a gas that can be extremely harmful or fatal. Always check to be sure the product you want to use can be safely mixed with bleach. If you are unsure, wash twice, first with bleach and water, then with the cleaner.

As you can see, preparation takes as much, if not more work, than actually applying the paint, but it is essential if you want the job to be one you can be proud of for years to come. Δ

Figure 3:





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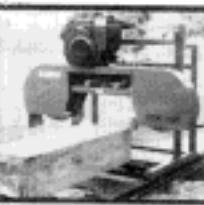
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Sadly, at least four upstart mills claiming "Country Living Mill" virtues and looks have appeared out of the Y2K melee. All of them make wondrous claims (some preliminary examinations show workmanship and quality to be haphazard and shoddy) but none can make this most important statement of fact: **"For 25 years we have been manufacturing as a family business (in America) the world's finest and most acclaimed quality hand mill—the Country Living Grain Mill. For all of those 25 years our family has serviced and stood behind the Country Living Mill without question. In fact we are so sure of our past we can easily and proudly say that any Country Living mill purchased will have a lifetime warranty!"**

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The signature is handwritten in cursive ink and appears to read "Jack Jenkins".

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October, 1999, Onalaska, Washington. It's shortly after midnight. I wakened by the song of the coyotes. I haven't heard this many lupine-like cries at once since the movie "The Howling."

I'm in a snug, Spartan cabin that, if men are still allowed to use the word, can be described as cozy. I pull on some trousers and slip on some shoes and a quilted coat with a fleece collar. Onto my belt go a powerful little SureFire 6P flashlight and a Morris Tactical Colt .45 automatic. The pistol wears Heinie "Straight Eight" night sights, and it's loaded with Triton ammunition that propels a 185-grain hollowpoint bullet at the "+P" velocity of 1150 feet per second. Experimentation has shown me that this round shoots so flat, it will send the bullet to point of aim at 100 yards. The coyotes will not be a problem, and I mean them no harm anyway.

The night is crisp and cold. The full moon is so bright it lights up the natural dale behind the cabin, save for the long shadow cast by a spruce tree. It's a sky you don't see at night in most cities, the stars arrayed brilliantly. With snow on the ground, the vista would qualify for a Christmas card. I don't mind being wakened by the coyotes. The quality of sleep you get in a place like this is so deep and dense that a few hours of it make you feel as if you'd slept all night in the city.

I realize I'm beginning to envy the people who live here all the time.

I was at that cabin, a guest house for instructors, while teaching for Marty

and Gila Hayes at the Firearms Academy of Seattle (FAS). After a dozen years as a street cop and firearms instructor, Marty realized he loved the latter part of his job the most and opened the above-named school in 1990. At first, he taught on rented ranges in Seattle. In 1995, he bought this property just outside Onalaska, WA, a rural community equidistant between Seattle and Portland, Oregon. The stage was set to leave city life behind, replacing it with a backwoods home lifestyle that allowed occupational self-sufficiency. Because the school's reputation had already been strongly established, he kept the original name despite the change in location. No one seems to get confused about it.

As a cop, Hayes was many times in the Governor's Twenty, that is, among the 20 best shooting cops in a state famous for high quality law enforcement training and function. He has won numerous awards, including the State Championship of Montana (IPSC, stock gun class). He uses a Glock .40 pistol for most everything: duty gun, off duty gun, teaching gun, and competition gun.

He has been married to Gila May Hayes for seven years. She's field editor of *Women & Guns* magazine and author of what many consider to be the best book out there for women who own self-protection firearms, Effective Defense: the Woman, the Plan, and the Gun. Her work has appeared in numerous gun magazines, and she has won the Stock Gun pin shooting championship of Washington state (overall, not just "women's class") and the women's championship at the National Tactical



Massad Ayoob

Invitational. (Marty has made top five at the same prestigious event.) Gila rarely goes anywhere without a Glock 9mm pistol at her hip.

The curriculum at FAS includes all types of training for use of handguns, plus defensive shotguns, carbines, and rifles. Some 18 separate ranges on the property allow shooting from moving vehicles and at moving targets, a dark house for night shooting at any hour of the day, and "houses" to clear live-fire. At least one range absorbs bullets at 360 degrees. All manner of knock-down reaction targets, made of steel for the most part, are available. Ranges go from muzzle contact to hundreds of yards, including the nearest "countersniper tower" this side of Thunder Ranch.

Some courses are geared for police exclusively, and FAS has hosted seminars of IALEFI (the International Association of Law Enforcement Firearms Instructors) and WSLEFA (the Washington State Law Enforcement Firearms Instructors' Association). Most of the courses, however, are open to any private citizen who has a concealed carry permit or can otherwise show proof of having passed a criminal background check.

Some of the most appreciated programs are the women's courses, taught by Gila and her all-female adjunct staff. Many women, especially those who have been brutalized in the past, are more comfortable working with female instructors. The overall adjunct staff is co-ed, with more than a dozen men and women who are advanced graduates and help out with ongoing programs. FAS also hosts outside trainers for special seminars: Jim Cirillo, John Farnam, Ken Hackathorn, Chuck Taylor, and myself among others. Approximately one hundred courses a year are offered, many on weekends for customer convenience, and some 700 to 800 people attend annually. The core clientele is from the Pacific Northwest, but an increasing number of their students come from around the country and from such foreign lands as Canada, France, Australia, and New Zealand as FAS' reputation grows.

FAS sits on some forty acres of prime back country turf. Whereas

most farmers mark out a soybean field and plant soybeans, then harvest and sell them, the Hayeses laid out ranges on the same place. Their harvest comes when students pay to shoot on those ranges, unlike anything they can get where they live. Set apart from the ranges are acres of Christmas trees, harvested annually by tree farmers who lease the property from Marty and Gila.

The Hayeses live where they work. When the guns fall silent, they can enjoy the peace of back-country living. It's a short walk from house to classroom, and a reasonable walk to the house from even the remotest of the ranges. Blacktail deer and rabbits abound on the property, and black bear and cougar are in evidence, not to mention the coyotes. A couple of deer a year are harvested for the family freezer. Canning and smoking food is a part of the lifestyle experience, as is the substantial garden. Cordial detente is maintained with the coyotes, unless they venture too close to the house. Marty's huge German Shepherd,

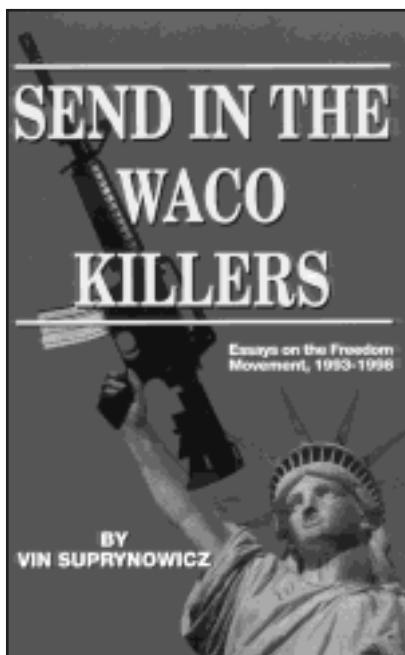
Carlos, and Gila's big Newfoundland, Zeus, are a match for any coyote, but that's not true of the house cats.

It's a beautiful place. For many of their students, part of the experience is camping out on the property during the course. Marty and Gila have managed to carve a dream existence while doing something they love, a job that means something. There are multiple FAS graduates whose training has saved them from death or horrible trauma. At least two of their female grads have shot and killed the men who were trying to rape them. In both cases, the shootings were ruled justifiable homicide.

A wonderful place, with wonderful people who have wonderful values. What better exemplification of the values of those whose lifestyle comprises the "backwoods home"?

For further information on FAS classes (or to order Gila's book, contact: Firearms Academy of Seattle, Post Office Box 400, Onalaska, WA 98570, 360-978-6100 Δ

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Had he lived 225 years ago he'd have written a book to detail how King George III and Parliament have tried to enslave us but, sadly, this book is about how our government today is depriving us of our freedoms and ruining the lives of thousands without changing even one word of our Constitution.

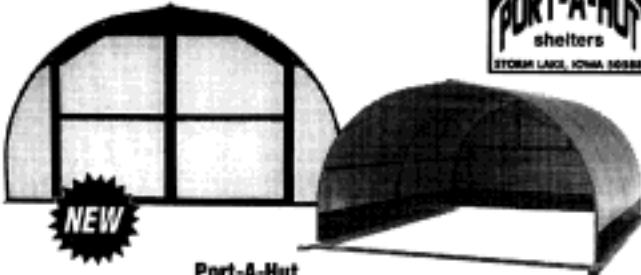
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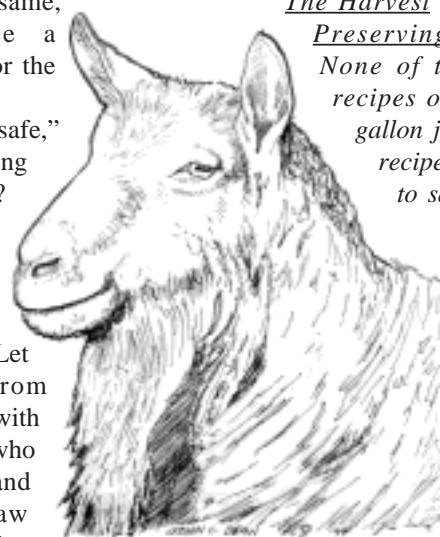
(Jackie Clay invites *BHM* readers to submit questions on any facet of low-tech, self-reliant living for this new column.)

I was wondering about pasteurizing goat's milk. I buy it from a farm, unpasteurized, in a gallon container from the refrigerator. Once I get it home and do the pasteurizing to 140 degrees, then cooling it to 40 degrees, do I just put it back in the jug and stick it back in the fridge? I just want to make sure it's ok to do that since it is already chilled when I buy it. Any info would be greatly appreciated. It is for my six-month-old baby.

Ashley Weh

While milk pasteurizes faster when put into the pasteurizer warm, it's perfectly okay to use the pre-chilled goat milk. The temperature reached for pasteurizing and the length of time used is the same, but you'll notice a longer time-frame for the process.

To be absolutely "safe," are you also sterilizing the original milk jug? (Medically speaking there could be bacteria "lurking" in the unsterilized jug from the raw milk.) Let me say though, from years of experience with both eight children who drank goat's milk, and experience using raw milk, that this is going to the extreme. Provided that the goat (or cow, for that matter) is healthy, having been tested negative for Brucellosis, having no abscesses, and that the milk is handled well from the time of milking to when a person



drinks it, I have seen absolutely *no* problems from drinking it raw.

(Goat abscesses can be from a contagious disease, which can be transmitted through the milk, although I don't believe anyone has shown that it can be passed to humans—only kid goats, drinking the milk.) And before anyone pins my ears back for not mentioning TB, Tuberculosis in goats is so extremely rare that it is nearly non-existent.

I know my own babies who drank both breast milk and raw goat's milk picked up a lot more bacteria off toys and their own fingers than they ever did from the milk. Goat's milk is great.

I have been reading all the issues by Jackie Clay on canning in Backwoods Home. I am new at canning this year. I have the books, Putting Food By, Stocking Up, Ball Blue Book, Keeping The Harvest and Canning and Preserving without Sugar. None of these books give recipes on canning in half gallon jars. I would like a recipe for canning tomato sauce in a half gallon jar and a canning recipe for a chili recipe in a half gallon jar and a bean soup recipe in a half gallon jar. The information I have read says that half gallon jars are not good for low acid food because the food does not cook correctly. I read that Jackie Clay cans using half gallon jars.

I enjoy all of Backwoods Magazine as does my husband. I especially look



Jackie Clay

forward to reading anything that Jackie Clay writes on self-sufficiency. Thank you for your wonderful magazine.

Darlene and Bob Feener

Yep, all the experts today advise against canning with one to two gallon jars. The reason for this is that some folks got into trouble by packing those huge jars full of cold or lukewarm food, then processing them the exact time....which "used to be" recommended by the Ball and Kerr canning booklets.

When I began canning a "few" years back, information was included in all the canning "how-to's" for using half gallon jars. So I just followed the directions, which required a longer period of processing time. This was given as 20% longer processing over the time required for quarts for meats and vegetables, which are of course canned in a pressure canner. Fruits, which are canned in a pressure canner using a half gallon jar, need an extra five minutes, and when canned in a water bath canner they require an extra ten minutes processing time.

Now, I don't recommend anyone use half gallon canning jars, but I *do* use them, and have for years. I *do* use

common sense, and when using them for meat and vegetables, and mixes such as chili and soups, I am absolutely sure that the item is boiling hot when it goes into the (hot) jars and is processed immediately. I'm sure if one were to put cold or merely warm chili into half gallon jars and exhaust the canner half-heartedly (so that steam was not shouting out the ports, only spitting out from time to time), they could run into trouble with improperly processed food that could spoil or cause health problems.

But as I've often said, I've canned for over 30 years, thousands of jars every year, and never poisoned any diner at my table! One of the bonuses of canning is the convenience of "instant" meals. And half gallon jars allow quick canning of large meals-in-a-jar. Just check each lid and the appearance of the product before opening to make sure the lid is sealed (indented in the center) and the food looks normal. Then sniff for any off odors. If it's fine, simmer for 15 minutes just to be sure. And enjoy.

But out of legality, remember I didn't advise or recommend that anyone use half gallon jars for home canning. Everyone is trying their best to

keep us safe from ourselves, including home economists and canning companies, and a lot of folks are sue-happy, as well. Δ

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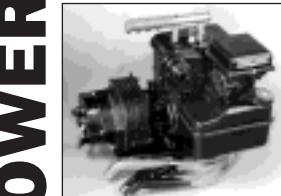
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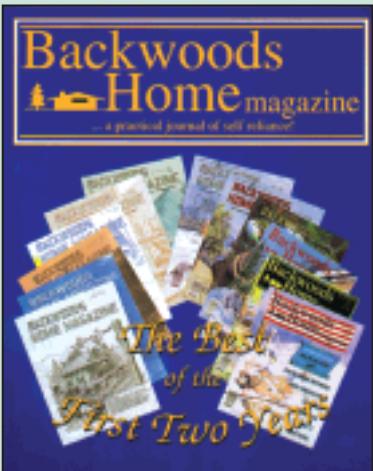
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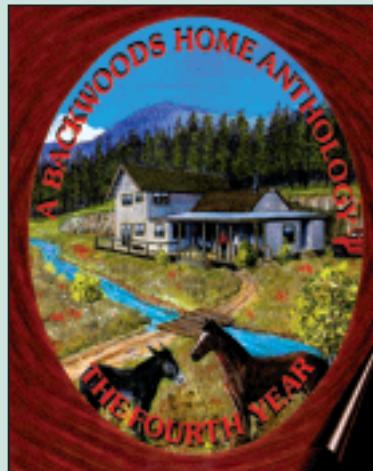
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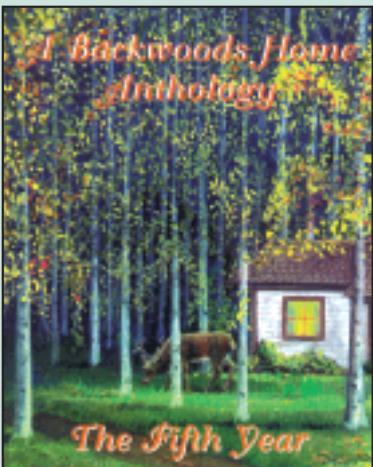
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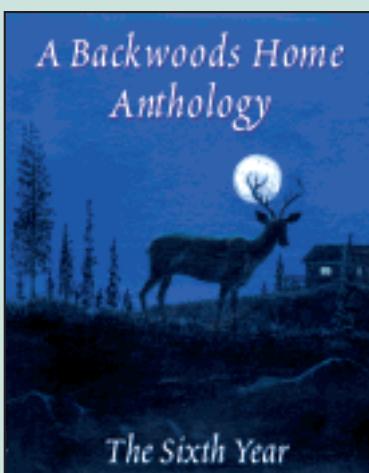
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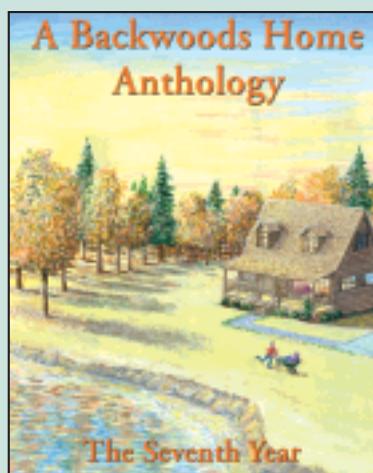
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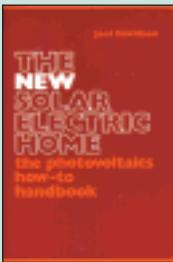
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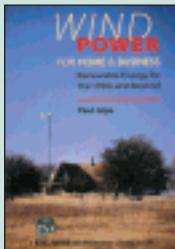


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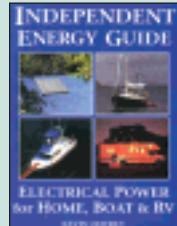
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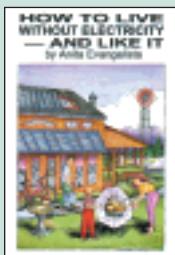
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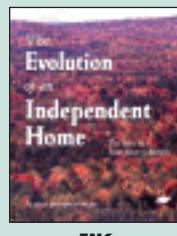
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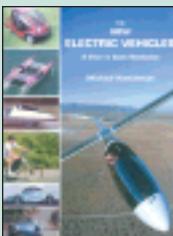
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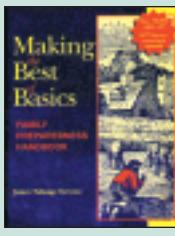


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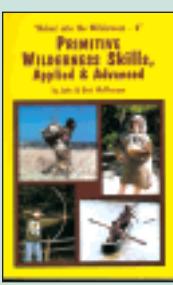


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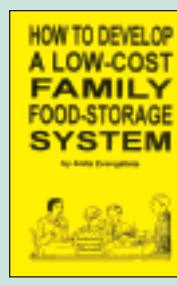
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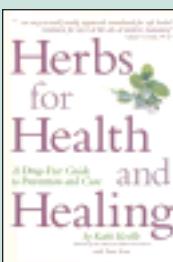


HOW TO DEVELOP A LOW-COST FAMILY FOOD-STORAGE SYSTEM

Here's how to institute a low-cost food-storage program. The author explains how to determine your storage needs, how to find sources of low-cost bulk foods, and how to choose among preservation methods. This book is a must for the family expecting hard times ahead!

114 pages; 5 1/2 x 8 1/2" ppbk. \$13.00

SS5

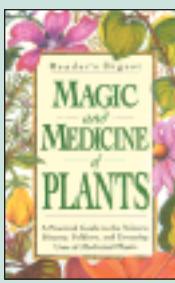


HERBS FOR HEALTH AND HEALING

One of the most informative and entertaining herb books on the market. Safe and simple herbal formulas for dozens of health problems. Includes special herbs for women, men, and children. Discusses using herbal fragrances to heal, herbal first aid, cooking with healthful herbs, and more. Photos and drawings are black and white.

374 pages; 6 1/2 x 9" ppbk. \$17.95

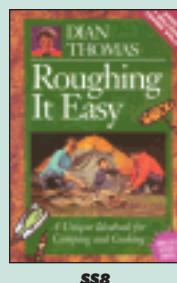
SS6



THE MAGIC AND MEDICINE OF PLANTS

A practical guide to the science, history, folklore, and everyday uses of medicinal plants. Learn to identify nearly 300 North American flowers and plants believed to have some therapeutic value. More than 700 color photos and illustrations. Fact-filled text.

464 pages; 6 3/4 x 11" hdbk. \$31.00



ROUGHING IT EASY

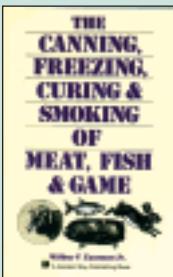
Dian Thomas, former co-host of the Today Show, presents her best-selling, all-in-one bible of camping and outdoor fun. This new enlarged and updated guide is filled with innovative hints for making camping and cooking safe, imaginative, and above all, enjoyable. Over one million copies sold. Read this book and hit the trail.

241 pages; 6" x 9" ppbk. \$17.95

SS7

SS8

Backwoods Home BOOKSTORE

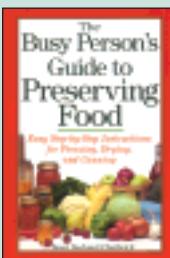


FP1

THE CANNING, FREEZING, CURING & SMOKING OF MEAT, FISH & GAME

This new book describes the best ways of processing meat, fish, and game with emphasis on canning, freezing, curing, and smoking in the home, at the camp...anywhere. It contains everything you need to get started including sketches for building your own smokehouse.

202 pages; 5 $\frac{3}{8}$ x 8 $\frac{3}{8}$ " ppbk. \$15.95

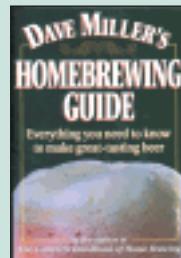


FP2

THE BUSY PERSON'S GUIDE TO PRESERVING FOOD

Step-by-step illustrated instructions for preserving fruits and vegetables: freezing, canning, cold storage, root cellaring, and drying. Includes recipes for meals, salsas, herbal vinegars, pestos, jellies, and teas.

212 pages; 6 x 9" ppbk. \$17.95

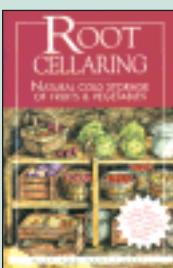


FP3

DAVE MILLER'S HOME-BREWING GUIDE

Miller provides brewers with his two decades of know-how to ensure that they make great-tasting beer or ale every time. Explains equipment of the 90's, recipe formulation, and troubleshooting. Includes 33 recipes.

358 pages; 6 x 9" ppbk. \$19.95

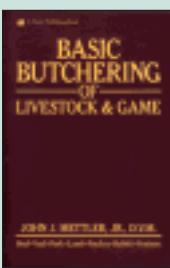


FP4

ROOT CELLARING

This book tells you how to use root cellaring as a means of natural storage. It is the first book devoted entirely to the subject and covers it thoroughly. It explains the vegetable and fruit varieties that store best, how to use root cellars in the country and the city, how to build your own root cellar, and more.

298 pages; 6 x 9" ppbk. \$17.95

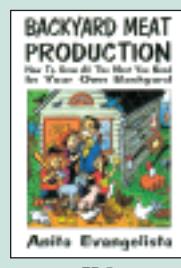


FP5

BASIC BUTCHERING OF LIVESTOCK & GAME

This book is for anyone who hunts, farms, or buys large quantities of meat. The author takes the mystery out of slaughtering and butchering everything from beef and veal, to venison, pork, and lamb. The text is easy-to-follow and there are 130 detailed illustrations to assist in the complete step-by-step instructions.

194 pages; 6 x 9" ppbk. \$17.95



FP6

BACKYARD MEAT PRODUCTION

With the helpful instructions in this book, you can easily meet your family's animal-protein needs for a fraction of the amount you currently spend, while maintaining a higher standard of quality control over feeding and butchering that will ensure healthier meat for you and your loved ones.

132 pages; 5 $\frac{1}{2}$ x 8 $\frac{1}{2}$ " ppbk. \$17.95



FP7

COLD CLIMATE GARDENING

Provides invaluable information to northern gardeners that shows how to grow food, landscape, protect vulnerable plantings, warm up the soil earlier, and just which species are appropriate to your area. This book is useful for those who garden in microclimates like valleys or hillsides or those who just want to extend their growing season in any climate.

308 pages; 6 x 9" ppbk. \$19.95

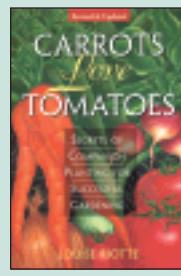


FP8

DIRT CHEAP GARDENING

This book contains tips, tricks, and hints that show you hundreds of ways to save money in your garden including how to reuse and recycle; identify and acquire useful tools; use low-cost ways to ensure healthy plants; buy, save, and start seeds; obtain plants cheap—or free; and even which plant varieties save money.

166 pages; 6 x 9" ppbk. \$12.95

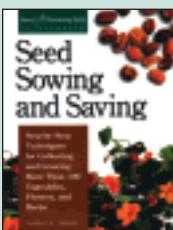


FP9

CARROTS LOVE TOMATOES

This is more than just carrots and tomatoes, it is a book about companion planting. It shows the gardener how to use plants' natural partnerships to produce bigger and better harvests, how to avoid putting together those that work against each other and even plants that promote natural pest control.

220 pages; 6 x 8 $\frac{7}{8}$ " ppbk. \$17.95

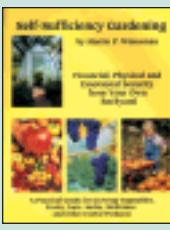


FP10

SEED SOWING AND SAVING

Here's all the information and guidance you'll need to start saving seeds from your favorite vegetables, herbs, and flowers for planting. Dozens of charts and over 300 step-by-step illustrations show you how to determine when seeds are ready for harvest and how to collect and store them.

218 pages; 8 $\frac{1}{2}$ x 11" ppbk. \$22.95

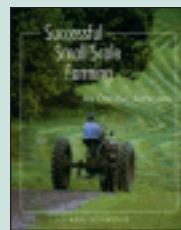


FP11

SELF-SUFFICIENCY GARDENING

This 128-page book is subtitled "Financial, Physical and Emotional Security from Your Own Backyard." It's a practical guide for increasing your self sufficiency by growing vegetables, fruits, nuts, herbs, medicines, and other useful products.

128 pages; 8 $\frac{1}{2}$ x 11" ppbk. \$16.95

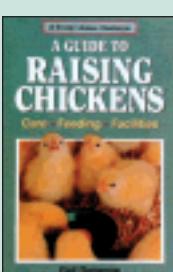


FP12

SUCCESSFUL SMALL-SCALE FARMING

This classic guide to organic small-scale farming—fully updated for the 1990s—covers a wide range of topics, including soil improvement, machinery, best cash crops, marketing, and essential skills. It shows that small-scale farms can be cleaner, smarter and more efficient than agribusiness.

134 pages; 8 $\frac{1}{2}$ x 11" ppbk. \$15.95

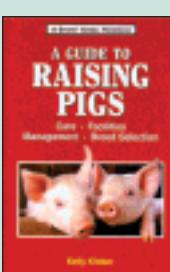


FP13

A GUIDE TO RAISING CHICKENS

This informative book is for both the beginning and experienced chicken owner and covers selecting a breed that will suit you and your environment, taking care of chicks, eggs for eating, raising broilers, feeding your flock, and troubleshooting the problems that are bound to occur.

341 pages; 6 x 9" ppbk. \$21.95

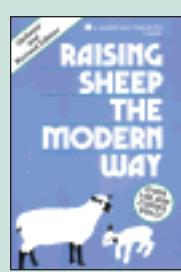


FP14

A GUIDE TO RAISING PIGS

This book offers small-scale farmers and 4-H or FFA youngsters clear, illustrated information about every aspect of pig raising. Included are choosing the right breeds, feeding and housing, health maintenance and disease prevention, butchering and pork processing, showing, and raising pigs as a business.

314 pages; 6 x 9" ppbk. \$21.95



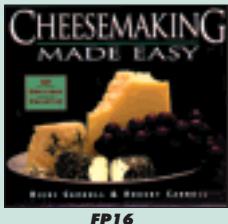
FP15

RAISING SHEEP THE MODERN WAY

Here's the small-scale sheep raiser's bible and it is newly revised to reflect the changes occurring in the industry over the last 13 years. It includes new theories about breeding, pregnancy management and the handling of lambs, new medications and vaccines, and a whole new chapter on guard dogs.

278 pages, 6 x 9" ppbk. \$15.95

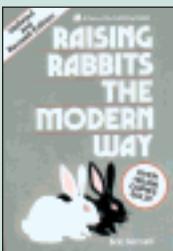
Backwoods Home BOOKSTORE



CHEESEMAKING MADE EASY

How to make 60 varieties of cheese at home and includes what equipment is required as well as how to prepare a starter culture, use rennet, control temperature, and color. It has an easy-to-follow format, photos, & illustrations.

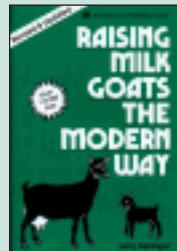
136 pages; 8 $\frac{3}{8}$ x 7 $\frac{1}{4}$ " ppbk. \$17.95



RAISING RABBITS THE MODERN WAY

This is the completely revised Garden Way Publishing classic on raising rabbits. It contains the most recent how-to information for successfully raising rabbits on a small to semicommercial scale including feeding, housing, medication, breeding, showing, and selling.

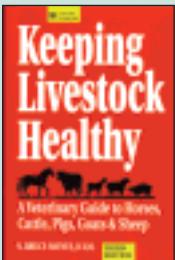
179 pages; 6 x 9" ppbk. \$15.95



RAISING MILK GOATS THE MODERN WAY

This newly revised edition contains up-to-the-minute information on diseases and medication, new breeds, new barn plans, and how to maximize the quality and quantity of milk your goats produce. It also provides clear, practical instructions for breeding, kidding, feeding, milking, housing, and other basics.

200 pages; 6 x 9" ppbk. \$15.95

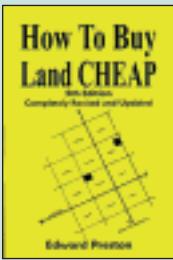


KEEPING LIVESTOCK HEALTHY

This newly updated edition has the latest information on the technologies and diseases that livestock owners need to know including developments in vaccines, artificial insemination, drug treatments and new information on diseases such as Lyme disease, Potomac fever, & BSE.

344 pages; 6 x 9" ppbk. \$22.95

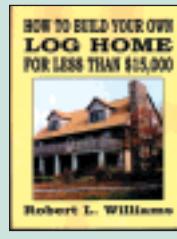
FP19



HOW TO BUY LAND CHEAP

Now in its Fifth Edition, this is the bible of bargain-basement guides for cheap land and houses. It's been used to buy building lots, lakefront property, and commercial land all over the United States and Canada, including land from drug seizures and S&L closings.

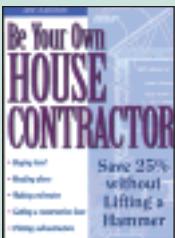
130 pages; 5 $\frac{1}{2}$ x 8 $\frac{1}{2}$ " ppbk. \$17.95



HOW TO BUILD YOUR OWN LOG HOME FOR LESS THAN \$15,000

The author built a 4300-square-foot log home for a fraction of the cost of conventional construction. This book covers site selection, planning, tools, techniques, the foundation, raising the walls, roofing, wiring, plumbing, stairs, windows, doors, and much more.

218 pages; 8 $\frac{1}{2}$ x 11" ppbk. \$22.95

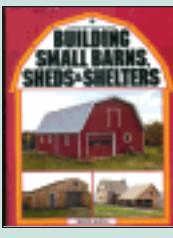


BE YOUR OWN HOUSE CONTRACTOR

Details the steps that go into building a house, from selecting land and getting it financed to developing plans and schedules, selecting subcontractors, negotiating contracts, and buying materials and supplies. The author is a construction loan consultant, former home builder, and the founder of two schools of home building.

138 pages; 6 x 9" ppbk. \$17.95

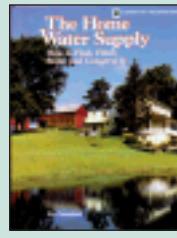
BU3



BUILDING SMALL BARNs, SHEDS & SHELTERS

Extend your working, living, and storage areas with these basic, easy-to-follow construction methods for multi-purpose barns, sheds, garages, root cellars, smokehouses, and much more. Everything from the tools and materials you need to finishing details are included.

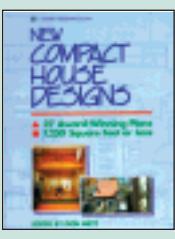
237 pages; 8 $\frac{1}{2}$ x 11" ppbk. \$19.95



THE HOME WATER SUPPLY

Concrete and money-saving answers to the questions of how to locate, move, and purify water. This book includes instructions for constructing ponds and how to hook up the plumbing in your home. Reading this you'll know when to try something yourself and when to call a plumber or other expert.

236 pages; 8 $\frac{1}{2}$ x 11" ppbk. \$21.95

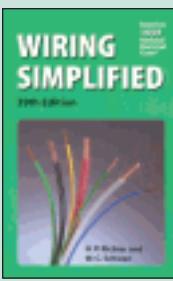


NEW COMPACT HOUSE DESIGNS

Here are the 27 best designs from a competition for single-family houses. Each house has a minimum of two bedrooms but none is more than than 1250 square feet. There are drawings, plans, and judges' comments along with addresses of the architects and designers for those interested in scale plans or more information.

188 pages; 8 $\frac{1}{2}$ x 11" ppbk. \$22.95

BU6



WIRING SIMPLIFIED

This is the 39th edition of Wiring Simplified, and it's based on the 1999 National Electrical Code. The book is organized into four parts: Getting started—the basics; Wires, circuits, and grounding; Installing service equipment and wiring; and Special wiring situations and projects. New topics include emergency back-up generators and low-voltage wiring.

226 pages; 5 $\frac{1}{2}$ x 8 $\frac{1}{2}$ " ppbk. \$12.95

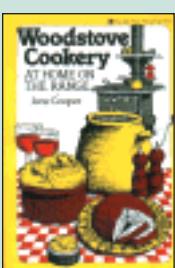
BU7



COOKIN' WITH HOME STORAGE

Vicki Tate and Peggy Layton reunite in this newly released version of the best book there is on cooking from home stored foods. These Mormon women have years of experience and expertise behind them, and in this excellent book they will show you how to incorporate your stored foods into your everyday life.

302 pages; 5 $\frac{1}{2}$ x 8 $\frac{1}{2}$ " ppbk. \$19.95



WOODSTOVE COOKERY

This book will tell you how to buy a wood stove—new or used, how to set it up, fuel it, clean it, and keep it in peak operating condition. But most importantly it will show you how to cook on it. There are dozens of recipes including breads, stews, roasts, soups, desserts and more. There's even food preservation. A must for the self-reliant.

196 pages; 6 x 9" ppbk. \$15.95

CR2

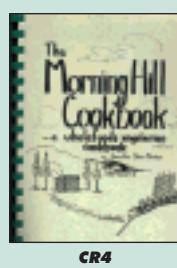


HEAVEN'S FLAME

This book provides detailed plans to build a very hot and efficient solar cooker from the barest of materials. The solar cooker can then be used to cook anything from snacks to full meals. Included is an explanation of how solar cookers work and accounts of how they are being accepted and used around the world to produce good cooked meals from sunlight.

145 pages; 5 $\frac{1}{2}$ x 8 $\frac{1}{2}$ " ppbk. \$18.00

CR3

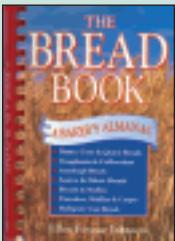


THE MORNING HILL COOKBOOK

For years, Backwoods Home Magazine readers have enjoyed Jennifer Stein Barker's wonderful vegetarian recipes in the pages of *Backwoods Home Magazine*. Now here is an entire book (182 pages) of her wholesome, delicious recipes.

182 pages; 6 x 9" comb bnd. \$14.95

Backwoods Home BOOKSTORE



THE BREAD BOOK

This book is a month-by-month almanac that offers 140 bread recipes from around the world. It is well illustrated with line and photographs and it contains time-saving tips and advice for the beginning baker.

230 pages; 6 x 9" comb bnd.
\$19.95

CR5

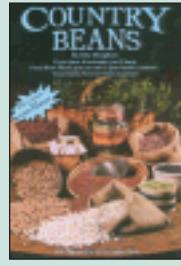


COOKIN' WITH BEANS AND RICE

This book is packed with fun-filled recipes that combine beans and rice, as well as other foods. Peggy Layton is a home economist who has written several books on food storage. With 7 children to feed, she cooks from bulk food storage on a regular basis, and this book reflects her extensive experience.

156 pages; 5 3/8 x 8 1/4" ppbk.
\$14.95

CR6

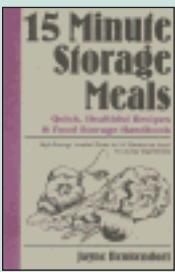


COUNTRY BEANS

Soups, sauces, and gravies in 3 minutes! 400 heart-healthy, cholesterol-free bean and grain recipes using wholesome storage foods. Learn how to make "user friendly" beans and cheap meals in 30 minutes or less. Low fat or no-fat bean soups, dips, sauces, and gravies from bean flours in only minutes.

196 pages; 6 x 8 1/4" ppbk. \$17.95

CR7

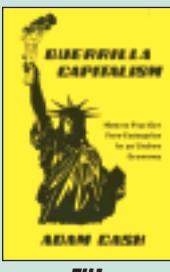


15 MINUTE STORAGE MEALS

Offers quick, healthful recipes that utilize the "fabulous 30" foods of high energy, which are rich in complex carbohydrates. These are high octane foods that will be valuable in an emergency. Illustrates the basic necessities and gives recipes for them. Contains a guide for things to store in your pantry.

133 pages; 5 1/2 x 8 1/2" ppbk. \$15.95

CR8

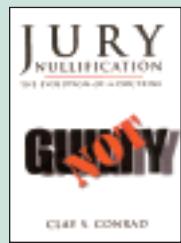


GUERRILLA CAPITALISM

Don't fork over all your hard-earned cash to the IRS! Beat the system and do business tax-free. This book shows you how to join the growing underground economy, how the barter economy works, how to run a business off the books, how to stay clear of the IRS, and how to practice free enterprise in an unfree economy.

172 pages; 5 1/2 x 8 1/2" ppbk. \$17.95

TH1

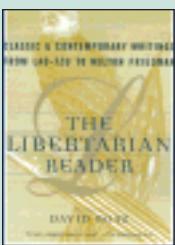


JURY NULLIFICATION

Our Founding Fathers ordained that jurors had the right to vote "not guilty" if a law is unjust or unjustly applied. This allows us to hold the government to the principles of the Constitution and prevent oppression. But American courts now systematically deny us this right. Read this book and realize your real power as a juror.

311 pages; 6 x 9" ppbk. \$25.50

TH2



THE LIBERTARIAN READER

A comprehensive anthology of libertarian thought with readings from the Bible, our Founding Fathers, philosophers, economists, and others explaining why the individual and personal freedom are more important than collectivism and the state. Here is the sensible alternative to the Democrat/Republican monopoly.

458 pages; 6"x 9" ppbk. \$20.95

TH3



A NEW DEAL FOR SOCIAL SECURITY

For more than 60 years, Social Security has been the most important source of income for senior citizens. Now facing severe crisis, this book examines the history of Social Security and argues that unless it is restructured and privatized, the baby boom generation, after contributing for a lifetime, will be left out the cold.

262 pages; 6 X 9" ppbk. \$13.95

TH4

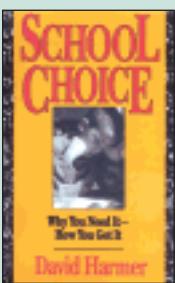


LIBERTARIANISM: A PRIMER

This book traces the history of libertarian thought and provides a concise yet thorough treatment of the subject. The writer discusses why libertarianism is morally just, efficient, and practical, and how it would affect public policy in America by leaving decisions in the hands of the individual, creating a freer and more efficient society.

314 pages; 6 x 8 1/2" hdbk. \$26.00

TH5

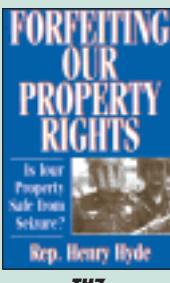


SCHOOL CHOICE

This book explains why public schools no longer work, why the NEA resists the reform that would save education, and how and why mounted one of the costliest political campaigns in American history to stop reform in California. Included is the compelling argument that shows why free choice in education is the one reform that will work.

203 pages; 5 3/8 x 9" ppbk. \$15.95

TH6

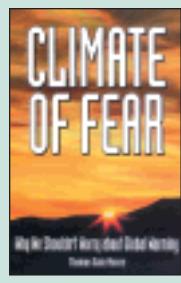


FORFEITING OUR PROPERTY RIGHTS

The government can take your home, your car, and your money without warning and never charge you with a crime—and the burden of recovery is on you! This book examines the abuse inherent in civil forfeiture, the law that lets government take property that is merely suspected of having "facilitated" crime.

100 pages; 6 x 9 1/2" hdbk. \$19.95

TH7

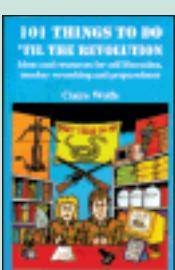


CLIMATE OF FEAR

Many climatologists believe that industrial emissions of carbon dioxide are leading to an increase in global temperatures. Economist Thomas Gale Moore asks, "So what?" His book argues that, based on both historical and economic analyses, a warmer climate would be, on balance, beneficial to both mankind and the environment.

177 pages; 5 3/8 x 8 7/8" ppbk. \$12.95

TH8

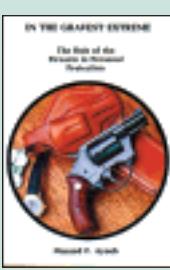


101 THINGS TO DO 'TIL THE REVOLUTION

For the concerned citizen who wishes to keep a low profile, protect his or her rights, and survive in the "interesting times" which are sure to come, this book is essential reading. Wolfe lists the supplies you should be laying in and activities you should be engaging in before stuff starts spraying off the fan. She also lists some interesting web sites you should look into.

200 pages; 5 3/8 x 8 3/8" ppbk. \$18.95

MS1



IN THE GRAVEST EXTREME

This is everything you should know before you consider acquiring a gun for self defense. Covers technical, tactical, and legal issues. Author Massad Ayoob, a police officer of many years' experience, is a nationally respected authority on firearms.

132 pages; 5 3/8 x 8 1/4" ppbk.
\$12.95

MS2



SEX AND SINS IN THE CEMETERY

This book contains over 70 of John Silveira's poems about love, work, and death...poems so stark and accessible, you will discover that he is revealing things about you as well as himself. Warning: Some of the poems are explicit and couldn't be published in BHM.

104 pages; 5 3/8 x 8 3/8 ppbk. \$8.95

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INDIAN PEAR TREES

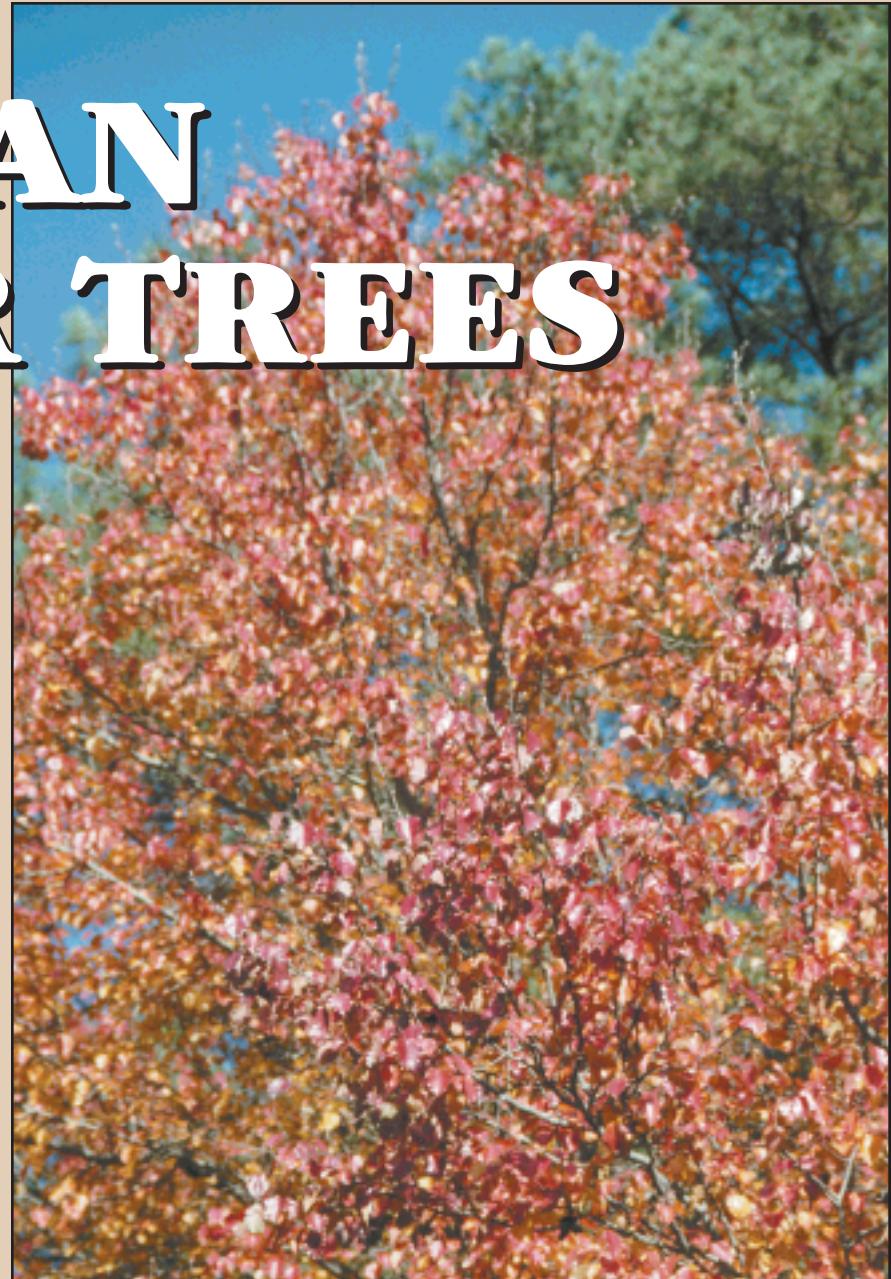
beauty plus bounty

By Alice Yeager
(Photos by James O. Yeager)

The year's honey flow begins in Southwestern Arkansas when the Indian Pear trees unfurl their pearly white banners. Honeybee scouts check out the swelling flower buds. "Not yet, but soon." When the scouts bring back good news to the hive, worker bees zero in on the opening blossoms with all the enthusiasm of football fans going to a conference game.

Bees working an Indian Pear tree give off an industrious buzzing. Some folks panic when they think there's a bee nearby. Personally, I like the sound of bees working. It's a comforting sound. All's right with the world—at least the bees' portion of it.

Indian Pear trees (*Amelanchier canadensis*) are members of the Rosaceae or rose family. The Amelanchier group consists of about 25 species of trees and shrubs, and most of them are native to North America. Some species grow only a few feet high and others, such as our Arkansas trees, attain a height of over 30 feet. These are the lovely, white-blossomed trees that light up our landscape while other trees still stand leafless waiting for better temperatures before beginning their spring



show. Other names used for the Amelanchiers are Service Berry, Shad Bush, June Berry, and Wild Pear. The group is widespread ranging from the Deep South up into Canada and as far west as they can manage to put down roots.

The Indian Pears have two prime seasons of unforgettable beauty—early spring and late fall. For some reason, known only to Nature herself, these trees have a staunch resistance to cold, as they bloom regardless of the chill

that greets the opening of their blossoms. On the other hand, maybe they just like to have the spring stage all to themselves as they stand decked out in gleaming white along fence rows, mingling with the green of cedars and pines or scattered along the edges of the naked hardwood forests.

Five-petaled flowers appear in clusters like domestic pear blossom but are a bit smaller than regular pear blossoms. Like their cousins, they have a pear blossom odor which is not the most fra-



Above: Fruit hangs on even when covered with ice. Leftover fruit will dehydrate and be consumed by birds flying north in the spring.

grant of scents. However this doesn't seem to deter the bees as they go about promoting these trees as a boon to bee keepers.

As petals begin to fall, silvery, somewhat hairy leaf buds swell into prominence and soon the trees are covered with shiny, finely toothed, ovate, green leaves about 2-4 inches long that shimmer at the passing of a breeze. During summer Indian Pear trees are very effective shade trees while they are nurturing their crops of edible bunches of small, round, apple-shaped fruit, each about $1\frac{1}{3}\frac{1}{2}$ inch in diameter. Some species ripen their fruit during the summer, but our Arkansas trees ripen theirs over a long period beginning with the chill of autumn and continuing well into winter. Ripe fruit is a dark brownish-purple with a sweet taste and soft to the touch. Again, Nature takes care of her own by providing food for her forest creatures over a major portion of the cold season, as Indian Pear fruit is a



good source of food for birds and animals alike.

These trees have long been a source of food for humans, too, as dried fruit was used by the Indians in making food called pemican. The fruit was gathered in quantity, pounded into a coarse meal-like consistency, dried and then mixed with cornmeal, pounded lean meat such as venison or buffalo, or whatever else was handy. The mixture was then patted into small cakes and cooked.

Not being quite as dependent on the wild as the Indians were, we use our Indian Pear fruit in a different way. We make an amber-colored, sweet jelly using commercial pectin, as the ripe fruit does not have sufficient pectin of its own to jellify properly. (See recipe)

Our Indian Pear trees don't seem to be choosy as to place or soil but are very tolerant of conditions under which many other trees will not grow. They live on dry, rocky hillsides as well as on moist, north-facing slopes and about the only areas they seem to avoid are



Above right: Newly fallen jewel colored leaves will become Nature's mulch thus beginning a recycling process.

Below right: These early blossoms are a boon to beekeepers.



Indian Pear trees bloom while other deciduous trees have bare branches.

river overflow areas or swamps. Our local trees never seem to show any damage from disease or insects. Wood is exceptionally hard and close-grained, making it useful for a number of items including wood handles. This is one of our heaviest native woods, as it weighs 52 pounds per cubic foot.

Indian Pear trees hold their green leaves until the other deciduous trees in the forest have shed most of their autumn finery. Then they gradually turn from green to gold to reddish bronze. Again, they take the spotlight from their neighbors. After a radiant display the colored leaves find their way to the ground and the clusters of fruit are easily visible. Birds begin to visit the trees picking here and there wherever the fruit ripens. If you are planning on making jelly, you had better gather fruit early. Due to thorns scattered about in strategic places, you are not likely to rob the birds of their entire winter's supply of fruit. If you aren't careful, you may come out somewhat battle scarred for your efforts.

Ingredients:

**3 lbs. Indian Pear fruit
5½ cups sugar
1 box fruit pectin**

Method: Gather at least three pounds of fruit. Wash, remove stems, and drain. Put fruit in graniteware or stainless steel pot (do not use aluminum) and add as much water as necessary to cover fruit. Bring to a boil and then lower heat, cover pan and let fruit simmer ten minutes. Stir occasionally to keep from sticking.

To separate juice from pulp, strain through a moistened jelly bag or several layers of porous cloth such as cheesecloth. The dripping process may require several hours, so don't be in a hurry to finish. After the dripping has stopped, you may extract a few more drops of liquid by gently squeezing the cloth. Discard pulp. Put juice in clean pot for rest of jelly-making procedure being sure that the pot is ample size to allow for expansion of a rolling boil.

You should have about 4 cups of juice. (Sometimes, after a very dry season, fruit will not yield as much juice as during a normal season and you will need to add a bit more water.) Stir one box commercial fruit pectin into juice and bring to a rolling boil over high heat stirring constantly. Stir in sugar and bring mixture back to a rolling boil and let boil hard for one minute continuing to stir. Remove from heat, skim off any foam present and pour immediately into hot, sterilized jars and seal. Makes about 3 pints. Serve with hot biscuits on a cold day.

After trying this recipe, if you find that you prefer a bit more tartness, next time add a tablespoon of lemon juice to strained juice before cooking.

Bird watchers enjoy a fringe benefit from these trees, as many species of birds feed on the fruit on their way south for the winter. Others wintering over dine on the fruit during the duration of the cold season. Northbound flocks will clean up the leftover dehydrated fruits in the spring.

Propagation is by suckers, seeds, or layers and we have found that the small young trees transplant easily. With large numbers of them being freely produced in the forests, the best and easiest way to find a young tree is to locate a parent tree while in leaf and proceed from there. You may be sure that there will be young trees nearby and scattered throughout the immediate area. Offspring are smooth barked, so don't be misled by the rough barked parent trees. If you can't transplant in early spring, tag your tree with a bit of cloth or string and move it in the fall. However don't expect it to be as small as it was in the spring as these trees are fairly rapid growers. Be sure to get as much of the root system as possible and

try to retain as much of the soil around the roots as you can. This cuts down on root shock.

After obtaining the tree and selecting "the right spot," dig a hole about six inches larger than the roots need. Be sure the soil in the bottom of the hole is loose. Place your tree in the center of the hole and a fraction deeper than it formerly grew. Fill the hole with pulverized soil (no clods) and water well to settle the dirt. To help the tree survive during dry periods in summer, circle it with an earthen dam about six inches high and thirty inches in diameter. (Dam will gradually settle.) Apply an organic mulch of pine needles, leaves, etc., and water when necessary. No fertilizer is required as Indian Pear trees thrive under poor soil conditions. Once it is established, the tree will probably do well without much attention and should bear its first blossoms and fruit in three years.

Our local species has a tendency to send up suckers around the base of the trunk, but if the suckers and lower

limbs of young trees are removed, the trees form a loose pyramidal shape making nice specimen shade trees for the yard. One of our Indian Pear trees has served as protection for a circular planting of blueberries for many years. The blueberry bushes thrive in the acid soil and the shade overhead filters hot summer sun rays making for pleasant blueberry picking.

For those persons who do not have access to areas where Indian Pear trees grow, there is a cultivated alternative. The Bradford Pear tree has many of the characteristics of our native tree although it is not as hardy. In appearance, the Bradford is more compact forming a globular shape. It does not grow as tall as the Indian Pear, but it blooms early, bears some fruit and soil requirements are the same. Bradfords are very popular nowadays for landscaping along highways, in parks, on public lawns, and so on. One drawback to the Bradford is its susceptibility to wind damage, whereas there is seldom a broken limb seen on a native.

Next time you decide to plant a tree for lawn or wildlife, try going native with an Indian Pear or bring in a Bradford Pear. The bees will thank you. The birds will thank you. There'll be a real bonus for you in beauty, birdwatching, and bounty for a long time to come. Δ

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THE IRREVERENT JOKE PAGE

(Believing it is important for people to be able to laugh at themselves, this is a continuing feature in *Backwoods Home Magazine*. We invite readers to submit any jokes you'd like to share to BHM, P.O. Box 712, Gold Beach, OR 97444. There is no payment for jokes used.)

Hillary Clinton is not feeling well. She goes to her doctor and gets a complete physical, only to find out that she is pregnant. She is furious and can't believe this has happened.

She calls the White House and gets Bill on the phone, and immediately begins to berate him, screaming: "How could you have let this happen? With all of the trouble going on right now, you go and get me pregnant! How could you? I can't believe this has happened! I just found out I am five weeks pregnant and it is all your fault! How could you? Well, what have you got to say?"

There is nothing but silence on the phone.

She screams again: "Can you hear me?"

She finally hears Bill's very, very quiet voice. In a barely audible whisper he says, "Who is this?"

Horseback riding

A blonde who has never ridden before and has never had lessons decides that she is going to go horseback riding. She mounts the horse unassisted and immediately the horse starts to gallop at a nice steady pace. The blonde, however, is bouncing from side-to-side. She tries to grab the horse's mane, but she can't get a secure hold. Then she leans forward and throws her arms around the horse's neck. All to no avail. The horse gallops from the saddle and is holding on to the side of the horse. Finally, she decides to throw herself free. Unfortunately, her foot gets caught in the stirrup and as the horse gallops on, her head is banging up and down on the ground. Just as she's about to lose consciousness, her quarter runs out.

Look Familiar?

Two blondes are walking down the street. One notices a compact on the sidewalk and leans down to pick it up. She opens it, looks in the mirror and says, "Hmmm, this person looks familiar."

The second blonde says, "Here, let me see!" So the first blonde hands her the compact. She looks in the mirror and says, "You idiot, it's me!"

Submitted by Baron Scarpia

On a bright, beautiful Sunday morning, everyone in the tiny town of Johnstown got up early and went to the local church. Before the services started, the townspeople were sitting in their pews and talking about their lives, their families, etc. Suddenly, Satan appeared at the front of the church. Everyone started screaming and running for the front entrance, trampling each other in a frantic effort to get away from the evil incarnate. Soon everyone was evacuated from the church, except for one elderly gentleman who sat calmly in his pew, not moving, and seemingly oblivious to the fact that God's ultimate enemy was in his presence. Now this confused Satan a bit, so he walked up to the man and said, "Don't you know who I am?"

The man replied, "Yep, sure do."

Satan asked, "Aren't you afraid of me?"

"Nope, sure ain't," said the man.

Satan was a little perturbed at this and queried, "Why aren't you afraid of me?"

The man calmly replied. "Been married to your sister for over 48 years."

Punctuation is everything

An English professor wrote the words, "a woman without her man is nothing" on the blackboard and gave the students an assignment to rewrite the sentence, using appropriate punctuation.

Male students rewrote the sentence to read, "A woman, without her man, is nothing." Female students rewrote the sentence to read, "A woman: without her, man is nothing."

The deaf mute

The crime boss and his attorney meet with his accountant. "Where is the 3.3 million you stole from me?" demands the gangster. The accountant is silent. The crime boss shouts, "Where's my \$3 million?"

The lawyer explains, "Sir, the man is mute and deaf. Allow me to translate."

Using sign language, the attorney asks the accountant about the money, and the message is relayed back that the accountant knows nothing about it.

Furious, the crime boss puts a gun to the mute accountant's head, screaming at the lawyer, "Ask him again where my money is or I'll blow his brains out."

"Okay! Okay!" the accountant signs back. "The money is hidden behind the old toolshed in my backyard."

"What did he say?" demands the enraged crime boss.

The attorney replied, "He says you don't have the guts to pull the trigger."

Submitted by John Illengwarth

Children's books that didn't quite make it

- You Are Different and That's Bad
- The Boy Who Died From Eating All His Vegetables
- Dad's New Wife Robert
- Fun four-letter Words to Know and Share
- The Kids' Guide to Hitchhiking
- Curious George and the High-Voltage Fence
- The Little Sissy Who Snitched
- Some Kittens Can Fly
- The Pop-Up Book of Human Anatomy
- Strangers Have the Best Candy
- Whining, Kicking, and Crying to Get Your Way
- You Were an Accident
- Things Rich Kids Have, But You Never Will
- Pop! Goes The Gerbil And Other Great Microwave Games
- The Man in the Moon Is Actually Satan
- Your Nightmares Are Real
- Eggs, Toilet Paper, and Your School
- Why Can't Mr. Fork and Ms. Electrical Outlet Be Friends?
- Places Where Mommy and Daddy Hide Neat Things
- Daddy Drinks Because You Cry

God came down and first he went to the Germans and He said, "I have Commandments for you that will make your lives better." And the Germans asked, what are Commandments?" And the Lord said, "Rules for living." And the Lord said, "Rules for living." "Can you give us an example?" "Thou shalt not kill." "Not kill? We're not interested." So He went to the Italians and said, "I have Commandments." And the Italians wanted an example, and the Lord said, "Thou shalt not steal." "Not steal? We're not interested." He went to the French and said, "I have Commandments." The French wanted an example and the Lord said, "Thou shalt not covet thy neighbor's wife." "Not covet my neighbor's wife? We're not interested." He went to the Jews and said, "I have Commandments?" "How much are they?" "They're free." "We'll take 10."

Two rednecks decided that they weren't going anywhere in life and thought that they should go to college to get ahead. The first one went to see a professor who told him to take math, history, and logic. "What's logic?" asked the first redneck. The professor answered, "Let me give you an example. Do you own a weedeater?" "I sure do," answered the redneck. "Then I can assume, using logic, that you have a yard," replied the professor. "That's real good," the redneck responded in awe. The professor continued: "Logic will also tell me that since you have a yard, you have a house." Impressed, the redneck shouted, "Amazin'!" "And since you have a house, that dictates that you

Two beggars are sitting on a park bench in Ireland. One is holding a cross and one a Star of David. Both are holding hats to collect contributions. People walk by, lift their noses at the man with the Star of David and drop money in the hat held by the man with the cross. Soon the hat of the man with the cross is filled and the hat of the man with the Star of David is empty.

A priest watches and then approaches the men. He turns to the man with the Star of David and says: "Young man. Don't you realize that this is a Catholic country? You'll never get any contributions in this country holding a Star of David."

The man with the Star of David turns to the man with the cross and says: "Moishe, can you imagine, this guy is trying to tell us how to run our business?"

A young punker gets on the crosstown bus. He's got spiked, multicolored hair that's green, purple, and orange. His clothes are a tattered mix of leather rags. His legs are bare and he's without shoes. His entire face and body are riddled with pierced jewelry and his earrings are big, bright feathers.

He sits down in the only vacant seat, directly across from an old man who just sits and glares at him for the next 10 miles.

Finally, the punker gets self-conscious and barks at the old man: "What are you looking at, you old fart? Didn't you ever do anything wild when you were young?"

Without missing a beat, the old man replies, "Yeah. Back when I was young and in the Navy, I got really drunk one night in Singapore and had sex with a parrot. I thought maybe you were my son."

Mary Clancy goes up to Father O'Grady after his Sunday morning service, and she's in tears. He says, "So what's bothering you, dear?"

She says, "Oh, Father, I've got terrible news. My husband passed away last night."

The priest says, "Oh, Mary, that's terrible. Tell me, Mary, did he have any last requests?"

She says, "That he did, Father..."

The priest says, "What did he ask, Mary?"

"He said, 'Please, Mary, put down that damn gun...'"

have a wife." "Betty Mae! This is incredible!" (The redneck is obviously catching on.) "Finally, since you have a wife, logically I can assume you are a heterosexual," said the professor. "You're absolutely right! Why that's the most fascinatin' thing I ever heard of. I cain't wait to take this here logic class."

The first redneck, proud of the new world opening up to him, walked back into the hallway where his friend is still waiting. "So what classes are ya takin'?", the friend asked. "Math, history, and logic," replies the first redneck. "What in tarnation is logic?" asked the friend. "Let me give you an example. Do ya own a weedeater?" "No," his friend replied. "You're queer, ain't ya?"

Cooking for a crowd

By Marjorie Burris

Of course, it is work to cook for a crowd, but with some good organizing and a few labor saving ideas, you can even enjoy the day when it is your time to host the clan for a holiday dinner or give a reception for a special occasion. And if you are having a good time, you can be sure your guests will notice and feel welcome, which is the first gauge of a successful party.

Plan the menu with the equipment you have available in mind. The amount of refrigerator space and oven space you have are usually the first things to be considered when planning a meal, but the size of your pots and pans and the seating space for your guests are a factor, too. It is difficult to cook a complete oven meal for 25 people with one small oven and many individual salads that must be kept refrigerated right up to the last minute before serving time just aren't practical in most home refrigerators. And don't even think about making soup or chili for a crowd in four-quart saucepans. Also, unless you are blessed with lots of dining space, a buffet style dinner will be more comfortable than a sit-down-and-be-served meal.

Equipment

I've learned to supplement my oven space with my big, black cast iron Dutch oven using it either on top of the cook stove or on top of the barbecue grill or buried in a bed of coals in the ground. A roast chicken or a beef stew is actually better cooked this way than in the oven. This leaves my oven open to bake rolls or bread so they will be warm at serving time.



A picnic ice chest with a tight lid makes an excellent extension to the refrigerator. A plastic bottle filled with water and frozen is better to use in the chest than a block of ice because it won't get the food in the chest wet when it melts. In the wintertime I will set the chest outside in a bank of snow and it will keep food cold without any additional ice on the inside. This is especially useful for jello salads, fruits, vegetables, juices, butter, and refrigerated yeast dough; these foods keep well at a little higher temperature than milk or meat. The ice chest is a good place to thaw a turkey or other large pieces of meat, too. The frozen meat keeps itself cool until it is almost completely thawed. To keep track of the temperature in the ice chest, put a small refrigerator thermometer in with the meat; when it starts to get above 45 degrees in the chest, add some ice to keep it at a safe temperature. A turkey takes about the

same time to thaw in an ice chest as it does in the refrigerator. But don't put anything else in the chest with the meat because the melted water out of the meat will contaminate other foods. I use a tablespoon of bleach in the dish water when I wash out an ice chest after thawing meat in it.

In the wintertime when the temperature stays between 35 and 45 degrees, you can use the great out-of-doors like a walk-in refrigerator. I keep a table on my screened-in porch and set foods in tightly covered, rodent proof containers there just like in a refrigerator. You don't want to do this in bear country, though.

If you do home canning, you will have large pots and pans to cook for a crowd. Otherwise, borrow a large pan, then put that on your Christmas wish list. A stainless steel pot holding at least eight quarts is one of the best utensils you can own. You will be surprised at how many times you

TABLE 1: AMOUNTS OF FOOD NEEDED FOR 25 AND 100 PERSONS

Food	25	100
beef (roasted)	10 lbs.	40 lbs.
beans, baked		
(canned)	1 No. 10	4 No. 10
(dried)	2½ lbs.	11 lbs.
beans, fresh string	5 lbs.	18 lbs.
bread (approx. 1 lb. loaf)	2½ loaves	10 loaves
cabbage (shredded for slaw)	5 lbs.	20 lbs.
coffee	½ to ¾ lbs.	2 to 2½ lbs.
crackers	1½ lbs.	6 lbs.
chicken (roasted)	18 lbs.	70 lbs.
fruit salad	4½ qts.	18 qts.
ham (roasted)	10 lbs.	40 lbs.
ice cream	3 qts.	3 gal.
lettuce for salad	4 heads	12 heads
meat loaf	5 lbs.	20 lbs.
potatoes (mashed)	10 lbs.	40 lbs.
(scalloped)	7½ lbs.	30 lbs.
rice	1 ½ qts.	6½ qts.
salad dressing	1 pint	2 qts.

will use it, even when you aren't cooking for company. Be sure to buy one with a lid.

Setup

For most occasions our family likes a buffet style dinner. I arrange the serving table so that the eaters can start at one end with napkins, plates, and silverware, proceed the main dish, then on to potatoes, vegetables and salads with breads, butter, pickles and jellies next. Desserts are placed on the far side of the table close to the door where they go out to sit down to eat. I put cups and drinks on the counter next to the exit, too, so they can pick them up last or easily return for what they can't carry the first time around. This arrangement keeps the line moving without much back tracking which slows up the others waiting in line to serve themselves. This way, even though my kitchen is quite small, I have served twenty-five people almost as quickly and easily as I can serve seven or eight.

How much to prepare

Decide how much food to prepare. One of the biggest challenges in cooking for a crowd is preparing the right amount of food. Nothing makes a

hostess feel more uncomfortable than wondering, "Have I fixed enough food for all these people?" And you don't want to have gallons of food left over, either. Through the years I have cooked at home many times for a small crowd of between 15 and 25 people for a holiday or a birthday, and I've cooked at church for a crowd of between 50 and 150 on several different occasions. When studying recipes for these meals, I've found some good reliable helps for planning amounts to serve.

There are a few rules of thumb to help when preparing foods: mashed potatoes, use one medium size potato per person; meat, figure one-half to three-quarters pound per person depending upon whether there is bone in the meat or not; vegetables and fruits, usually one-half cup per person. But my best guide for amounts of food came out of an old cook book published 50 years ago and now long out of print. The amounts given seem to be right even for today's appetites. I repeat the amounts here for the most used foods. (See Table 1.)

It is good to know can sizes when cooking for a crowd, too. Always study the information given on the label of the can when making a decision on how much to buy; some canning companies differ in-the amount of food and the manner in which they can a product. I list the most popular can sizes in Table 2.

Prior preparation

Do as much as possible before the day of the dinner. At least a week before the dinner, check your linens, dishes, pots and pans. If you haven't used something for awhile, make sure it is in good working order, i.e., no handles broken, no tears in the linens,

TABLE 2: CAN SIZES

Industry term	Approx. weight of fluid measure (check can)	Chief uses	Number of servings
6 oz.	6 oz.	frozen concentrated, natural juices	1½ pt.
8 oz.	8 oz.	fruits & vegetables	2
12 oz.	12 oz.	family size juice	3 pt.
No. 300	14-16 oz.	pork & beans, meat products	3-4
No. 303	16-17 oz.	common size for fruits and vegetables	4
No. 2	1 lb. 4 oz.	juices, ready to serve soup, pineapple	5
No. 2½	1 lb. 13 oz.	fruits, pumpkin sauerkraut, tomatoes	7
No. 3 cylinder or 46 fluid oz.	3 lb. 3 oz. or 1 qt. 14 fl. oz.	economy size fruit & vegetables, whole chicken, institutional size condensed soup, some vegetables	10 to 12
No. 10	6½ lb. to 7 lb. 5 oz.	institutional size fruits and vegetables	25

Hot Cocoa for 24 servings

Ingredients:

1 cup sugar
1 cup cocoa
4 cups water
3 quarts reconstituted powdered milk
2 12 ounce cans evaporated milk
 $\frac{3}{4}$ tsp. salt
1 Tbsp. vanilla

Mix sugar, cocoa, salt, and water. Bring to boil in large saucepan, stirring constantly. Slowly add milks and vanilla. Heat until milk is scalded. Beat with rotary beater just before serving.

no dishes cracked. Wash those good dishes you use only a few times in the year. After being stored, most linens will need to be washed to make them fresh. You don't want to be scurrying around the day of the dinner to do laundry or to find another pot or dish. And don't leave any shopping for last minute items to be done the day of the party, either. It wears you out to run to the store in a hurry; you will need your energy to be a good hostess.

You can prepare many dry mixes ahead of time which will make it faster when you get ready to bake your dessert or bread. I keep pie crust mix on hand at all times; I triple my pie crust receipt of flour, shortening and salt, cut the shortening into the flour and salt, then store it in a three pound shortening can. When I'm ready to bake a pie, I measure out enough of the mix for a crust, add the correct amount of water, and roll it out. Pie crust is even tastier made from your mix, because the flour and shortening seem to meld while stored.

If serving a cake, mix the dry ingredients several days ahead of time, then finish the cake when you want to bake it. A good refrigerated yeast dough can be made several days ahead of time, too. Then, the day of the dinner, all you have to do is pinch out the rolls and let them rise in time for baking. If you plan the right kinds of desserts and a jello or fruit salad you can make these the day before the feast. The evening before, if you are

Tater dipped chicken for 50

Ingredients:

50 chicken pieces (leg and thigh combination or breast and wing combination)
8 eggs, slightly beaten
1 cup water
2 1/2 Tbsp. salt
1 tsp. pepper
8 cups instant mashed potato flakes
1 lb. butter, margarine or shortening

Start heating oven to 400 degrees. Combine eggs, water, salt and pepper. Dip chicken pieces in egg mixture; roll in potato flakes. Meanwhile, melt butter in two 15" x 11" x 2" baking pans. Place one layer of coated chicken pieces, skin side up, in each pan of melted butter. Bake, uncovered, for 30 minutes. Turn and bake 30 minutes longer or until tender.

Italian spaghetti for 25

Ingredients:

1 cup salad oil	1 1/2 cups snipped parsley
6 lbs. ground chuck	1 1/2 lbs spaghetti, broken in thirds
6 medium onions, diced	3 quarts tomato juice
6 cloves garlic, minced	3 cups chili sauce
1 tsp. oregano	3 six-ounce cans sliced mushrooms
7 tsp. salt	Parmesan cheese
1 1/2 tsp. pepper	

About 1 1/2 hours before serving: In large kettle heat oil; add meat, onion, garlic; cook until meat is browned, stirring as little as possible so meat stays in fairly large chunks. Add all other ingredients, except parmesan cheese. Cook, covered, over low heat, stirring occasionally, about 45 minutes, or until spaghetti is done. Let each person help himself to parmesan cheese.

Peach crisp pudding for 48

Ingredients:

1 lb. margarine or butter	2 gallons soft bread crumbs or cubes
2 lbs. sugar, granulated	1 gallon or two #10 cans sliced peaches, drained

Cream butter and sugar. Combine with bread crumbs; add peaches. Pour into two greased baking pans 10" x 18" x 2". Bake 350 degrees approximately 40 minutes until firm in center. Serve with whipped cream or peach sauce. Cut each pan into 24 equal pieces.

Peach sauce for pudding:

1 1/2 quarts peach syrup	3/4 cup cornstarch
3 cups sugar, granulated	3/4 cup butter or margarine
1/2 tsp. salt	

Combine syrup, sugar, salt, cornstarch and butter. Stir well until blended. Bring to boil and thicken over direct heat, stirring constantly. Set over hot water after thickening for 10 min. to complete gelatinization.

using onions and celery, dice them and store in an air tight plastic bag and keep in a cool place. Clean other fresh vegetables and store. Lay out potatoes to be peeled just before cooking.

If possible, set the table the day before, or at least lay out within easy reach everything you will use on the table. You can cover the table with a clean sheet to keep the dust off. Anything you can do ahead of time will make it easier come "The dinner" time.

Start early the day of the dinner—give yourself plenty of time. It is better to have everything ready and waiting than to be frantically hurrying to be done in time to serve. Figure out how much time it should take to cook the meat, then allow an extra half-hour, or better yet, an extra hour. That way, just in case the meat doesn't cook as quickly as you planned, you will have time to cook it longer. Take the meat from the oven 30 to 40 minutes before serving time, then make gravy. Start carving the meat about 20 minutes before serving and stack on a heated platter. Cover with foil and set in a warm oven with the heat turned off or in a roasting pan partly full of hot water and set over low heat which will hold the heat much like a steam table. Vegetables and soup can be kept warm the same way. Cut desserts an hour before serving. If serving whipped cream, whip it at that time and refrigerate it. Make coffee and tea after cutting the desserts.

If you run out of refrigerated space, put crushed ice in a roaster pan and set bowls of food on the ice.

Clean up

Clean up as you go. Make a pan of dish water and, as soon as you get through with a mixing bowl or a utensil, turn to the sink and wash the dish and let it drain to dry. There is usually a few minutes after you get everything cooking on the stove to start cleaning up. Don't stack things to be washed all at once later.

When we have a family dinner, we station someone at the sink to wash dishes as they are being used. When food is taken up to be served, we hand the empty pan to the dishwasher. By the time the meal is on the table most of the cooking utensils are clean and out of the way making room at the sink for the serving and eating dishes. My daughters-in-law tell me they can enjoy their dinner more when they know there is not a big pile of dirty pots and pans waiting for them in the kitchen. Δ



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Bologna sandwiches and roasted rabbit

By Habeeb Salloum

I don't know what I'm going to do with all this bologna!" My mother was speaking to herself as she tried to find room for two huge bologna rolls in our kitchen cupboards while waiting for the rabbits to finish roasting in the oven. Watching her storing the bologna, I was elated. For me it would be feast time after the threshing crew had moved to the next farm. I could hardly wait. My mouth watered as I thought of the leftover bologna we children would feast on in the days to come.

It was the time of the year which I loved best. Every late summer, just before threshing time, my father would drive, with horse and buggy, into town to buy food for the hard-working crew. Of course, with little money, he had to buy affordable meats and this meant, in the main, bologna—enough to make sandwiches for two days to feed a threshing crew of eight to ten.

For a few days our usual wholesome Middle Eastern dishes disappeared from the daily menu. My mother would never think of preparing chick-pea and lentil stews or our scrumptious Middle Eastern salads, or even kubbah, a tasty burghal and meat dish. Living with an inferiority complex, like most other new immigrants, she believed that our food was not good enough for the palate of non-Syrians. For meals, she served the crew fried or roast chicken along with boiled or fried garden vegetables, and for lunch bologna sandwiches. The hard-work-

ing crew never had an inkling that this was not our usual fare.

For us children, it was a joyful time of the year. There was always some bologna—to me like the Biblical manna, falling from the sky. Strangely when I think of it now, in those youthful years, this prepared meat was to me the epitome of foods.

Watching my mother stowing the bologna rolls away, I dreamt of endless bologna sandwiches in the days to come. I thanked God for the rabbits which were now roasting in the oven. Perhaps, I thought, my mother on the morrow was going to prepare chicken or even rabbit sandwiches for the crew. Hence for us—more bologna. In my dream world, the rabbits roasting in the oven were God-sent. This year, during the first day of threshing, one of the men had shot three jackrabbits and asked my mother if she would cook them for next day's dinner. An excellent cook who could quickly improvise a meal, she agreed. To her, a new dish was a challenge which she relished. Apparently, he had heard from our neighbors that she prepared mouth-watering exotic meals. That evening she skinned, cleaned, then rubbed the rabbits with vinegar mixed with herbs and spices, leaving them to marinate overnight. The next morning after washing, drying, then stuffing them with a rice-nut stuffing, she slowly roasted them in the oven, basting them often in a basting juice enhanced by more herbs and spices.

At dinner that evening, my mother never had so much praise for her cooking. I vividly remember every member of the threshing crew lauding



her culinary ability, insisting that they never feasted on such a delectable meal. Later, they asked her to make sandwiches from the meat for the next day's lunch. Listening to them, I became excited thinking of the extra leftover bologna.

As for myself, even though I enjoyed the delicious rabbit meat and the savory stuffing, I still yearned for bologna sandwiches. In the days to come, we children were to glory on the leftover bologna made possible by the succulent roasted rabbits. For me, at that time, it was bologna gourmet time which lasted over a week.

Subsequently, as the years passed by, my love for bologna faded away until today I can hardly stand its taste. However, the taste of the rabbits my mother prepared for the threshing crew has remained with me through the years. More than once, I have replicated my mother's roasted rabbits with what I believe to be some success. Nevertheless, it still seems to me that they cannot truly match her meal for that threshing crew. They well had a point when they came to a consensus that roasted rabbits were unmatched in the field of culinary art. Δ

ROASTED RABBIT (with side dishes, serves from 6 to 8)

Ingredients:

1 farm-raised rabbit, about 4 lbs, cleaned, washed, and dried	
3 Tbsp. lemon juice	1 tsp. ground fennel seeds
1 tsp. sage	1 tsp. salt
½ tsp. pepper	

Rub the rabbit inside and out with a mixture of the lemon juice, fennel, sage, salt, and pepper. Then set aside for at least two hours. In the meantime, prepare the following stuffing:

Stuffing:

3 Tbsp. butter	¼ lb beef or lamb, cut into ½ inch cubes
½ cup rice, rinsed	1 cup boiling water
½ tsp. salt	½ tsp. rosemary
¼ tsp. pepper	1/8 tsp. nutmeg
1/8 tsp. allspice	1/8 tsp. ground cardamom
½ cup toasted blanched almonds	1 medium onion, finely chopped

Melt butter in a saucepan, then sauté meat until it turns light brown. Add rice, then stirfry for a minute. Stir in water, salt, rosemary, pepper, nutmeg, allspice, and cardamom. Cover and bring to a boil, then allow to simmer over medium heat for 15 minutes. Stir in almonds and onions, then set aside for stuffing.

In the meantime, combine all of the ingredients for the basting juice and set aside.

Basting juice:

½ cup water	¼ cup cooking oil
1 tsp. thyme	½ tsp. salt
½ tsp. garlic powder	½ tsp. pepper
½ tsp. cumin	1/8 tsp. cayenne

Stuff rabbit, then sew closed. Place in a roasting pan with 1 cup of water, then baste generously. Cover, then place in a 350° F preheated oven. Roast for an hour, basting lavishly every 20 minutes. Remove pan cover, then cook and continue basting, using pan juices if basting juice finished, for another hour or until meat turns tender. If rabbit is not brown, broil for a few minutes. Serve piping hot.

Note: If you use a wild rabbit, clean and wash it while wearing gloves. If animal is diseased this will ensure that the cook will not catch the disease. Roasting will kill any bacteria making the rabbit safe to eat. Also, to eliminate the wild taste, soak the cleaned animal for at least 2 hours in a cup of vinegar mixed with enough water to cover the rabbit.



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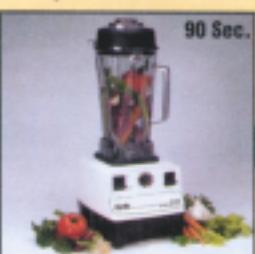
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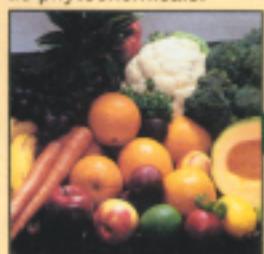


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Total Time



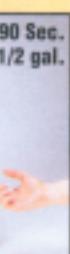
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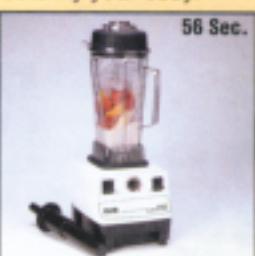
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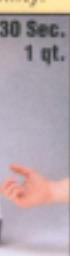
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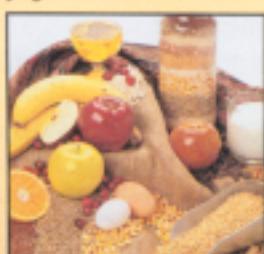


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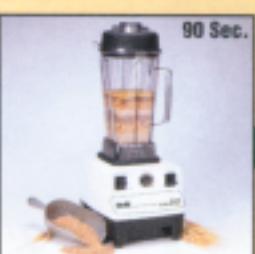
—M.H., Missouri



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Sunny Solutions

for north slope applications

By Michael Hackleman

Solar-powered pumps have proved their worth for many installations worldwide, anywhere under the sun. However, in the northern hemisphere, a year-around spring located at the base of a north-facing slope presents special challenges if it is to be pumped with the energy of the sun. Here's a lofty solution with a down-to-earth price.

The existing system

The Jergenson brothers—Richard, Phil, and Kent—installed a good design of water system for their land at Summit, outside of Willits, California. A small solar-powered pump delivers water from a spring to several tanks located at the highest point on their land. From there, the water is delivered and pressurized energy-free anywhere on the property.

One challenge of this system has been sufficient access to solar energy. Initially, two solar panels mounted on a homebuilt cart could be positioned in a tiny meadow to catch a generous portion of the summer sun and ensure full tanks. At that time, the biggest use for the water was irrigation of a new orchard. Seasonally, the pump was



The tower-mounted panels are north of the spring's tank.

disconnected and the water line drained for the winter months.

As dwellings and humans have appeared on the land, naturally the water demand has gone up. The system's bottleneck was immediately apparent. More panels would help the summer effort but do nothing in the shadow of the mountain immediately to the south during winter months. The panels would need to be relocated. It was at this point that I was asked to help find a solution.

I reviewed the system's initial design. Two ARCO M-75 modules were directly connected to the 24V SlowFlo pump with an adequate gauge of wire for its length.

Site considerations

The spring-fed tank is located with a forested slope rising to the south. Northward is a small meadow beyond which the slope drops off steeply. In the meadow, the solar array had easily found much of the summer sun.

At first, I looked for a new solar site in any direction. There are several types of electronic gizmos that can step the output voltage of a solar, wind, or hydro system to higher values to cover fairly long distances. Unfortunately, no site was available in any direction for six hundred feet or more that would find the winter sun most of the day.

Fortunately, I was onsite at the winter solstice. When the clouds unrolled for a few moments. I was able to see the light of the winter sun hitting the tops of the 30-foot trees at the northern edge of the meadow only 70 feet from the pump. In fact, the shadow of the mountain top was clearly etched across the trees far to the east and west. Before, the trees both upslope and downslope had made it impossible to observe the sun's angle or the contour of the mountain directly.

The design solution

It was immediately clear to me that a 40-foot tower would put the PV modules into unobstructed sunlight for as much as 6 hours in winter. Further investigation revealed that this position would also place the modules above trees to the east and west that had previously prevented full use of the sun's energy on summer days.

Guyed and free-standing towers were both considered. A guyed tower depends on three or more wire sets secured to anchors spaced around and away from the tower to keep it upright. Freestanding towers depend on a wide spacing of the legs at the bottom and well-designed concrete footings.

This application favored a guyed tower. Wind-machine weight loads a tower to a much higher degree than a few solar panels. In use, a windmachine's blades transfer big loads to a tower, while solar panels don't. Tilted panels, particularly in summer, shed even more wind loading. Four guy wires ($\frac{1}{8}$ -inch) would easily handle these loads beyond 100 mph of wind-speed. All four wires had a dual role.

They were positioned to also help safely raise and lower the tower.

While a tower design would address most of the challenges in pumping water through the year, I also recommended to the Jergensons the addition to the system of a LCB (linear current booster) designed for this pump. This works as an electronic "transmission," helping with an earlier morning pump startup and partly cloudy skies throughout the day. This feature is essential in the weaker sun of winter.

Tracking the sun will also increase PV output. While daily (east-west) tracking was considered too expensive a solution for this installation, seasonal tracking (collector tilt) was added. The rack for the twin modules was attached to the top of the tower through a pivot bolt aligned perpendicular to the north-south line. A continuous cable (marine-type rudder) system from the array to a lever at the base of the tower was designed to permit a change in the tilt of the array, locking at virtually any angle. This allowed the Jergensons to align the PV array with the sun anywhere in its 46 degrees shift throughout the year.

Building the tower

I selected the tower material from a "parts pile" out at Summit. Several long sections of Telspur had already caught my eye. Telspur is square box tubing made of galvanized steel that's punched with holes throughout its length on all four sides. This makes it lightweight and helps mount hardware without drilling or welding. Different sizes of Telspur telescope snugly inside of one another. I joined two long 2-inch square Telspur sections (one 20-foot long, the other 14-foot long) by bolting each to a 6-foot long $1\frac{3}{4}$ -inch square section inserted inside and spanning the joint. The result was a tall, strong, lightweight tower.

Telspur sections, along with other hardware, were transported to the meadow. I assembled the main tower sections on the ground, using tree

rounds to elevate the work to a comfortable level. At what would be the upper end of the tower, I slipped an 8-foot length of $1\frac{3}{4}$ -inch square Telspur into the main section to act as a tower stub. To this I bolted the pivoting framework that would hold the two modules.

While most of this project was a solo meditation, Kent's son, Colby, wanted to be involved. I put him to work designing foot pegs. With the tilt mechanism controlled from the tower base, there was no need to climb the tower in normal use. Still, the tower was strong enough to handle the weight of a person, and the lure of all those pre-drilled holes was strong for maintenance work. Colby came up with a good scheme for staggering and spacing the foot pegs with the materials at hand. Bolts were used with big flat washers and lengths of plastic pipe to make the pegs (see photo).

Meanwhile, I worked out where and how to attach the guy wires, both to raise the tower and safely hold it in position once it was vertical. I opted to attach two sets of four guy wires to the tower, one set at the top and the other midway up. (I traditionally add



The original installation—two modules on a homemade cart to power a pump in the spring tank.

guy wire sets in multiples of 20 feet; a 40-foot tower needs two sets, a 60-foot tower needs three sets, etc.). Guy wires were attached to the tower via thimbles pushed through eyebolts. Thimbles prevent crimping and weakening of the wires, allowing them to be safely doubled back and clamped. The process was repeated at the anchors with turnbuckles added to change the tension on the wires.

An array-tilting feature was added. I choose a variation of the continuous wire system (like that used to control the rudder of many boats) for this function. This keeps the array rigid through tension but easy to adjust when desired. Simple experimentation located the right attachment points at each end so that the lever kept both wires tensioned uniformly through tilt changes. I used small pulley wheels to route the wire through angle changes. The modules were bolted to the rack, electrical cable was wired from the pump to the collectors (the pump worked!), and the tilting mechanism system was tested and tuned.

Rigging the tower

Tower raising is 95% preparation and perspiration and 5% actual raising. Since I wanted the Jergensons to be familiar with raising the tower—a most helpful exercise when the day comes to lower it—I waited to finish the rigging until I could get everyone together on the day we planned to raise it.

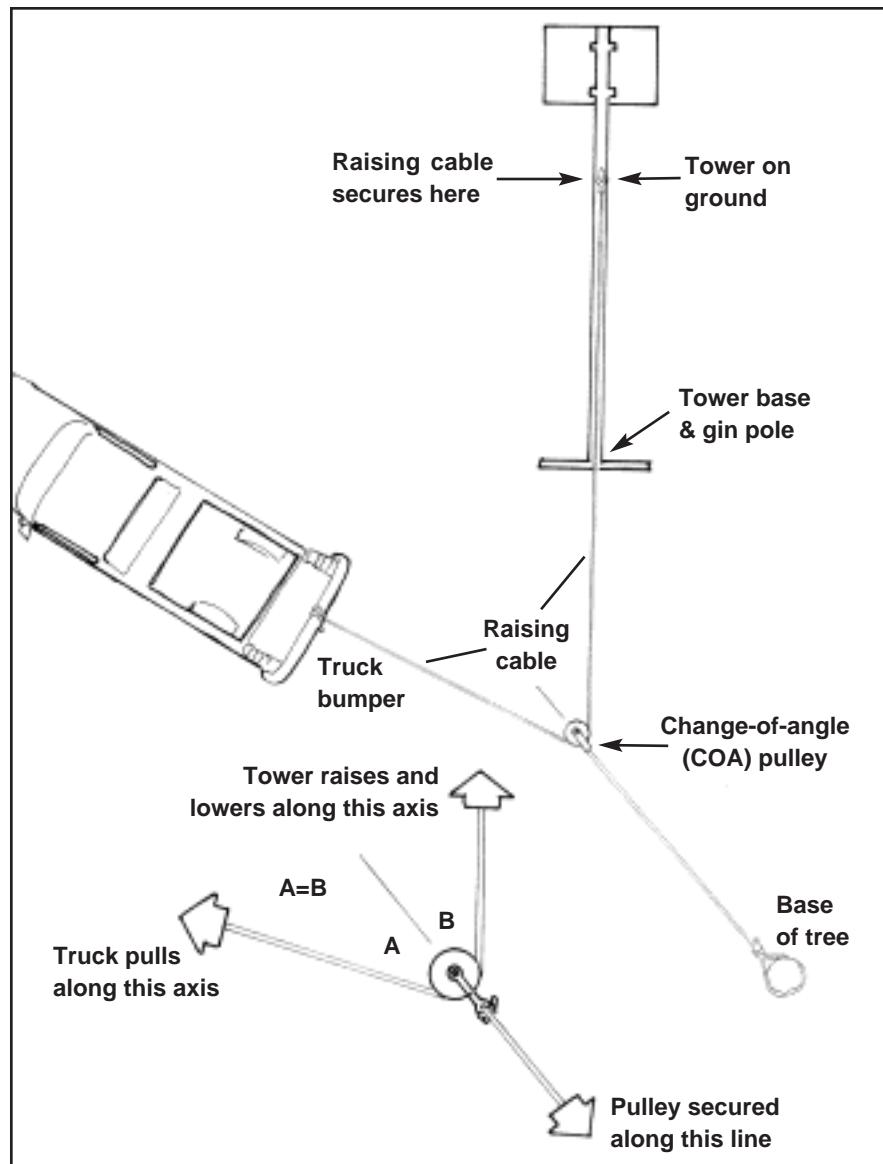
I figured out a way to raise this tower long before I started building it. The solutions may at first evade me but I know the right questions to ask. (I devoted the biggest chapter in an earlier book, The Homebuilt Wind Generated Electricity Handbook, to the subject of tower raising.) There are as many variations on the way to do this as there are towers to raise. Large objects (rocks, trees, and buildings), icky spots (mudflats and streambeds), and non-solid areas (ravines and ponds) will dictate what you cannot do. Uneven terrain will complicate the

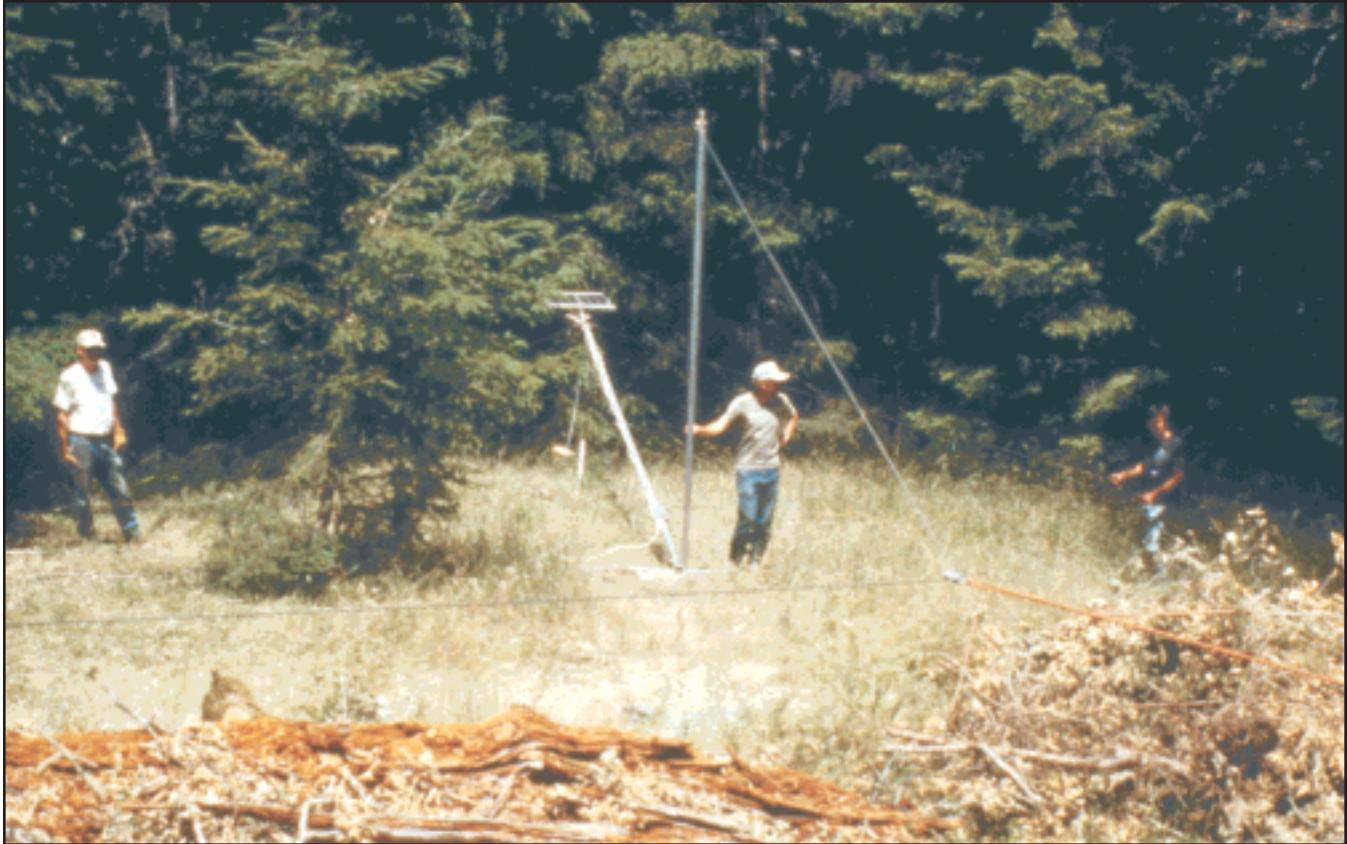
setup somewhat. Rigging a tower for a raise is a three-dimensional experience. Paper is two dimensional, containing side and top and, at best, isometric views. I sketched out a plan and included notes that I could revisit and revise as needed.

The challenges of *this* installation were clear. The site had poor vehicle access, yet we had no winch. We wanted to use a vehicle to pull a cable and raise the tower, but we would have no direct raise angle. That is, the best way to lay the tower and raise it was *not* in alignment with the way the vehicle could move.

The solution was to thread the raising cable through a pulley that was positioned at the junction of two imaginary lines representing the tower's alignment and the vehicle's direction of travel. A length of climbing rope was used to secure this pulley to a tree that would effectively bisect these two angles (see drawing). This sounds complicated but it really isn't. Realize that the tension in the raising cable is equal on both the tower and vehicle side of the COA (change of

Below: A diagram of the tower-raising setup ensures that everyone is working on the same page.





Phil, Kent, and Richard Jergenson test the tower's rigging at the Lift and Bounce point.

angle) pulley. Connect the raising cable through the pulley to the tower and vehicle bumper and tension it slightly. Now, adjust the length of rope holding the COA pulley to its anchor (in this case, a tree) until the raising cable on the tower side is aligned with the tower's axis. As long as the truck moves along the same axis it makes with the raising cable, the COA pulley will stay in position during the tower's raise.

I've used wires and cables interchangeably so far—because they are. I selected twisted wire cables available from hardware stores for all guy wires that would hold the tower erect. In our salt-free environment, galvanized wire supplies good weatherability. Harsher environments may dictate stainless steel (aircraft) cable.

Guy wires perpendicular to the raising axis (side wires) are easiest to rig. Simply connect one end to the tower on each side—one midway, one near the top—and the other to their anchor. In theory, their length on the ground is equal to their length raised. Unequal ground will throw this off somewhat, so compensate or leave an extra 10%

to their length for later adjustment. A benefit of this geometry is that these wires will maintain a tension throughout the raise, protecting the tower from swinging or falling to either side.

I located all four anchors equidistant around the tower and 30 feet away. (Locate anchors not less than half the distance away as the tower is high.)

Since I could not go beyond 30 feet in the western direction, I held the remaining anchors to this distance to simplify the geometry. Thus, I was able to cut and affix both the back-support wire set and the front-support wire set on the ground by merely duplicating the lengths of the side wire sets. (Back-support wires prevent endover during raise. Front support wires permit the removal of the raising cable once the tower is vertical.)

A 10-foot long section of Telspur was bolted perpendicular to the base of the tower to act as a gin pole. A gin pole's job is to give a lift angle to the raising cable, decreasing the initial tension (pounds of pull) on the raising cable before the tower starts to lift. A shorter length of Telspur was bolted perpendicular to both tower and gin

pole at their intersection. For this size of tubing, it created a tri-joint, locking everything solid at 90 degrees.

I used one long length of 3/8-inch steel cable for two functions: anti-slip and raising cable. Even with a tall gin pole, most of the initial tension of the raising cable wants to pull the bottom of the tower in the direction of the pull. Securing a cable between the bottom of the tower and the anchor for the backsupport wires prevents this slippage. The remainder of the steel cable was looped around and clamped to the top of the tower, threaded through a pulley at the top of the gin pole, threaded through the COA pulley, and looped around and clamped to the truck's bumper. Rope can be substituted for these jobs if it and the block & tackle hardware are sized for the load.

Raising the tower

A good tower raising is one that can be stopped, even reversed, at any point. Accordingly, it takes the worry out of getting everything right the first time, especially if there's a crowd. Actually, there were only four people

present at this raise—Phil, Richard and Kent Jergenson, and myself. Once the rigging was complete, we had our pre-raise meeting. Herein, we discussed the different steps of the raising process, what to watch for, what to do, what not to do, etc. I assigned Phil and Richard to the side guy wire anchors, with escape routes identified. Kent would handle the truck. I positioned myself near the COA pulley and aligned with the tower. We were ready.

I established five stop points during the raise. Pre-lift. Lift and bounce. Gin pole pre-clear. Pre-vertical. Vertical. Of course, the raise can be stopped if anything gets too light or if something unexpected happens. (Do I need to mention that you should discourage all participants from running amuck within the area of the tower's reach? Solar panels and towers are expendable, lives are not.)

Pre-lift

I signalled to start edging the truck backward, tensioning the raising cable until the tower just started to lift. I yelled and signalled stop. We inspected cables for slippage and tautness, and any slippage of the tower base. Everything checked okay.

Lift and bounce

I signalled to pull until the tower top was about two feet clear of its tree round and stopped. The greatest stress on the tower, cable, and cable connections in the raising of a tower is the moment of liftoff, when the cable tension is the greatest. If you can't make it break or slip here, it's unlikely to thereafter. (After 51 tower raisings, it hasn't yet.) I sat on the tower top. It sagged down but held. I bounced. It bounced.

Gin pole pre-clear

The raising continued until the cable was ready to clear (rise away from) the gin-pole. Stopping here permits two important inspections. First, will the method to re-position the raising

cable over the gin pole work if the tower must be lowered? Second, how is the tension in the side guy wires? One side-guy wire can be taut while the other is slack. This is normal, suggesting only that the tower is being pulled to one side or the other by a slight misalignment of the raising cable. An adjustment in the position of the COA pulley may be needed if the tension is too high on one side. In no case should guy wires on both sides of the tower be tight simultaneously.

This suggests an error in guy wire lengths. Correct this condition by loosening the guy wires on the side that allows the tower to find its center.

Pre-vertical

The raising was continued until the tower was at an angle about 15 degrees short of vertical. Here the back-support cables are checked to ensure they will keep the tower from following the raising cable too far past the vertical point.



Above: Foot pegs facilitate tower climbing. UV-rated electrical cable is cable-tied to the tower. **Inset:** An LCB mounted at the tower's base assists the pump in early morning startup or in winter sun.

Vertical

The tower was brought vertical. Actually, the weight of the raising cable was enough to bring the tower upright the last 10 degrees, balancing the tension in the back-support cables.



Above: The 42-foot tall tower is slender but is easily climbed to clean the modules and inspect the hardware and wires. (Always wear a tower belt!)

Right: After the raise, I asked Kent and Richard if they were happy and this was their response.

The front-support cables were attached to their anchor so the raising cable could be disconnected. A bubble level was used to confirm that the tower was vertical and guy wires loosened or tensioned until uniform.

Post-raise

The raising took about 10 minutes from start to finish. We toasted the event with a beer before taking photos. Post-raise rigging took another 45 minutes. The solar panels were rotated to the correct tilt. I climbed the tower, releasing the raising cable and enjoying the view. I couldn't coax anyone into climbing the tower. I think its light weight and the slenderness of the tower and guy wires gives the impression of flimsiness to the casual observer.

Climbing or working on a tower looks easy just watching but is difficult for the average person to attempt, much less feel comfortable doing. Time helps. I remember how shaky the tower felt the first few times I climbed on one. As with bicycles and skateboards, one's own nervousness contributes to the shaking. Take your time, rest, look around. Use a tower belt. Climb to a point where you feel comfortable, hook up the tower belt, and let it do the job of holding you there, hands free. Move slowly, attaching and detaching methodically.

I figure it's as close to a spacewalk as I'm likely to get, so I revel in it.

Nine months later

The spring site and tower are presently unreachable by vehicle during winter months. As spring approached, I walked in with a friend to check things over. Record-setting winds and gusts during the winter had me feeling a little apprehensive. When we reached the clearing, we found everything as we had left it. The pump was running. When I tried to change the angle of the panels, I found the angle-changing mechanism to be jammed. I climbed the tower to find that the cable had jumped off its guides. This I quickly remedied. This summer, the tower will get concrete reinforced guy stations and a concrete base. We won't have to lower the tower to do this.

Altogether, this project was simple, inexpensive, and highly successful. The Jergasons were amazed at how little material, money, time, and effort went into this project. I encourage anyone buried in the trees or stuck on the wrong side of the hill to consider a similar solution to bring the power of sunlight to any worthwhile application.

(Tower raising is one whole chapter in [The Homebuilt Wind-Generated Electricity Handbook](#), (Peace Press, 1975, 194pp) and is available for \$10 from Michael Hackleman, POB 327, Willits, CA 95490. Or email: mhackleman@saber.net) Δ



Letters

(Dear Readers - Thank you for writing to Backwoods Home Magazine. The opinions and suggestions we receive from our readers are very important to us. We regret that we are no longer able to print or individually respond to every letter received due to the volume. We do read every letter received, and pass them along to the editor or writer concerned. We print a selection from our mail that best represents the views and concerns of our readers.

— The Editors)

Irreverent jokes

Why do you print these irreverent jokes? It signifies, in my opinion, a debasement of your magazine. Why not choose the high road? Keep your magazine clean, and factual. Also, jokes don't have to be gross to be funny. Be noble, and drop the crude jokes.

Rich Hoenzsch
otto@csc.albany.edu

Libertarian philosophy

I really enjoy BHM. What really convinced me to subscribe was your consistent libertarian position in issue #59 advocating the legalization of drugs as well as gun ownership rights. I consider myself a small "l" libertarian. I once was a dues paying member of the Libertarian Party. I quit in 1988 when the party's nominee for President, Ron Paul, betrayed the party's platform on the issue of abortion rights. The Libertarian Party's platform has always defended a woman's right to choose! Since then I have joined the Green Party because of their strong environmental views.

I also like your profiles of historical figures who have championed freedom over tyranny. But I wish you could go outside the American experience to do articles on other advocates of freedom such as the Greek philosopher Zeno (336-246 B.C.), Gerrard Winstanley who in 1649 founded the Diggers, Jean Jacques Rousseau, and

William Godwin among others. I would also recommend reading Howard Zinn's *A Peoples' History of the United States* to learn that Big Business as well as Big Government has been a detriment to real freedom in this country. I think we would've been better off with the Articles of Confederation rather than the Constitution.

One comment you made to a letter-writer in issue #60 was incorrect. You stated that Mother Earth news had folded. It is still being published and I see a new issue on the newsstand every two months. Unfortunately, it's a pale imitation to what it was in the 1970s. Back then buying Mother Earth was like making a statement to this consumerist society. Now it's about as boring as Popular Mechanics!

Richard Clark
Salem, IN

My apologies to fans of *The Mother Earth News*. I did not mean to say she is still out of business. She had folded about 1990, was subsequently bought out of bankruptcy court, was relaunched, and has been alive and healthy ever since with a paid circulation that makes my mouth water.

— Dave

Cartridge box loaded

I browsed your "stinking 2nd Amendment" article and found it scholarly. Your review of *Send in the Waco Killers* describes an equally worthy writing. . . . We have a "two party" system where each party realizes they cannot have it all. They have cut a deal, decided to divide the spoils, all the while locked in a contrived and perpetual Good vs. Evil struggle (depending upon which side you are on) a la "Brave New World"

... Republican favorite George Bush, Jr. favors raising the age to own long guns from 18 to 21. Candidate "Dizz Lizzy" Dole also supported increased gun control and her husband former Senator Bob "Three Time Loser" Dole refused to consider an attempt to repeal the so-called assault weapons ban after the Republican "Revolution" in 1994. Revolutionary thought at its finest!

This proves the ballot box no longer works. The federal judge overturning the jury not guilty verdicts at the trial of the Waco survivors shows the jury box no longer functions as designed. The soap box is a wasted effort. Over the past 20 years, I have written dozens of letters to the editor, to state and congressional representatives and senators, yet our government's slide into statism hasn't slowed. It is only a matter of time before someone will take a last stand when faced with the Gun Gestapo at their door to collect a politically incorrect firearm, make him a defacto criminal and confiscate the rest, possibly costing him his employment, home and family's security. Or maybe it will be the Eco-Nazis . . .

An eloquent and scholarly discussion on our rights will serve us no purpose if it is done from the wrong side of the concertina wire. We are dealing with irrational, illogical firearmphobes who cherish order above freedom, animal "rights" over individual liberties and responsibilities. They use our police and military against us with the eager help of opportunistic, self-serving politicians; all for the supposed good of The Children. I'm keeping my cartridge boxes loaded.

Alvin York
sargonnas@mailcity.com

Unaware young people?

I have to say that I think Mr. McCravy is way off about blissfully unaware young people. (#59, Pg. 83). The young are no worse. There are

just as many unaware, "boxed-in" thinking "old" people. Although the welfare state is everywhere, some still have foresight and brains enough to think for themselves. I had unpopular ideas and an unusual awareness of gov't intrusion long before I knew anyone who felt the same. They called me a "red neck" in high school! (I'm in my 20's now.)

I believe (and hope) that with the increasingly obvious gov't intrusions more people will begin to see things differently. Also, with increased homeschooling filtering out gov't influence, we're creating a growing contingency of independent, thinking citizens. I don't believe Mr. McCravy is giving family and God created intelligence enough credit.

S. Sweet
St. Maries, ID

Slow cooker

Read J. D. Hooker's article on the Slow Cooker, issue #60—I made one very similar to this quite some time ago and use it as a "non-electric" yogurt maker. Mine is made with a 2 qt. food grade round plastic container for the liner and a 5 qt. ice cream bucket for the outer housing. Cut a circle of 2 inch styrofoam to fit inside the ice cream bucket on top of the 2 qt. liner and that's it.

Rod Summitt
rods@ticz.com

Ram pump

In the water system article in issue #59 Mr. Hackleman discourages potential ram pump users with the statement "the hydraulic ram needs running water, which, over the length of your property, must drop in elevation at least 10 to 15 feet to be useful." The veracity of this statement lies in the definition of useful, but your readers with small holdings or moderate water requirements can use a ram pump with much less fall.

Our own babbling brook has a mere 3 feet of fall, yet our "el

cheapo" ram pump delivers 95 gals/24 hrs for stock use and gardening to a tank 400 feet away and 21 feet higher. This is accomplished with a 1" diameter x 40' drive pipe and a 1/2" delivery line. The tank acts as a reservoir and pressurizes the system.

Where power is in short supply, we think a ram pump is much more practical than Mr. Hackleman intimates.

Stephen & Lori Kirkham
Bridgsville, B.C., Canada

Canning nuts

I've been canning many years and think you will like this way of canning nuts. The latest copyright date on my Kerr canning book is 1958 and the cover price was 25 cents. I've used this method for the last five years and it works just great.

Walnuts or Pecans—Cold Pack:

Put nut meats into clean Kerr Jars (Clean of course and dry). Put on the cap and screw hand tight. Process in the oven. Use lowest possible heat, 225 degrees for 45 min.—any size jar.

Ardath Schmidt, Luverne, MN

The Bill of Rights

. . . In a country saturated by the media with stories about how our "benevolent" government can provide everything for everyone without cost to anyone, and in a country where the terrifying costs of allowing the government to have this much control of our lives are never mentioned by this same media, such candor in a nationally distributed publication is rare, and for this we say "Thanks, Dave!"

As self-responsible individuals we feel as strongly as you do about using the principles of libertarianism as our life's guiding philosophy. Some years back when my wife and I first discovered libertarianism, for the longest time I was hard put to find an easy explanation when describing the libertarian principles to someone who was not familiar with them. And

then somewhere I found or heard a brief yet concise definition that stuck with me and that I have used ever since. It goes as follows: "Do what you say you are going to do and leave the other guy and his property alone." Just think how much better off this whole world would be if we all followed these two simple rules.

Of course if we all followed these simple concepts we wouldn't have the huge intrusive government that is slowly but surely whittling away at the basic freedoms so clearly enumerated in the first ten amendments of the Constitution. Which brings me to another reason why we enjoy BHM and that is the columns by John Silveira, especially when he is writing about the Bill of Rights. I wonder how many folks (in particular the young) realize how important these amendments are and the role they play in constraining the government. As long as they remain intact we remain a free people. To the extent that they are weakened by enacted legislation that is upheld by the Supreme Court, to that extent we move closer to a totalitarian government.

Perhaps the best analogy of how the government gradually nibbles away at our freedom is the method described for cooking a frog. If you drop a frog into a pan of very hot water he'll just hop right back out. But if you were to place him in some luke warm water that made him comfortable and then gradually brought up the flame, the frog would just sit there, feeling warm and cozy until it is too late and he is cooked. Unfortunately this is what seems to be happening today in this country. The legislators stroke and sooth us as they promise us some Utopian dream while contained in each new law are the tools to forge the chains, which will ultimately make us all slaves. One only has to look at our history and ask . . . Are we as free a people

today as we were when this country was born in 1776?

Case in point; I recently read that several states celebrated an amendment (which passed by a voice vote) to HR 1501 that would allow public schools to display the Ten Commandments in the classrooms. The thinking probably goes that if the students see and read these biblical laws they will perhaps be influenced by them and as a result become better behaved. Notice that I used the word behaved and not informed or learned. The authors of the Bill of Rights recognized that government at any level should have no power to influence who or where or what we choose to worship. The first amendment is very clear on this subject . . . "Congress shall make no law respecting an establishment of religion or prohibiting the free exercise thereof . . ." I am sure that a lot of people see little harm in posting the Ten Commandments in a public school classroom and might have a hard time associating this action as an intrusion on the First Amendment.

But before summarily accusing me of nit picking let me make my point. According to biblical history God handed down the Ten Commandments to Moses. But just whose religion were they intended for? In so far as these commandments deal with murder, stealing, lying or cheating I doubt that anyone would quarrel with obeying them. But besides these "moral" laws these Commandments also contain the admonishment against worshipping idols or false gods. If I worship an Eastern God and you a Western God am I worshipping a false god? If I pray to a statue of the Virgin Mary or Christ on a cross and you pray to a statue of Buddha, which of us is breaking the Commandment about worshipping an idol. How can anyone say these are not strictly religious issues? If I choose not to worship any god am I then violating a

Commandment? And since we already have laws against harming other people what happens if I choose not to obey the rest of the Commandments? Am I then answerable to the State?

On the surface this amendment appears harmless and folks who hold strong religious beliefs see no harm in having the Commandments displayed in the classroom, but I urge you to remember the parable of the frog. And remember that it is not the laws contained in the main body of the constitution that make this country the envy of other countries; it is the rights enumerated in the first ten amendments. I have asked any number of students at all grade levels if the Constitution and more particularly the Bill of Rights are ever studied in school. Almost without exception the answer has been "a little." I am not surprised; all governments fear an informed citizenry. Yet if any document should be displayed prominently in schools everywhere it is the Bill of Rights. Better yet every legislator and bureaucrat should be made to memorize them and be forced to recite them loudly and in public at least once a month (like maybe on payday?).

If each and every one of the first ten amendments were studied in depth, sooner or later these young citizens would begin to see the hypocrisies practiced by their government. Or maybe a lot of them already recognize they are being lied to and the idea that they are being forced to live this lie everyday in these government propaganda camps is the cause for a lot of their rebelliousness. This is hardly the result wanted by an all powerful or despotic government.

The Ten Commandments may codify religious laws but these are and should be strictly between you and the deity you worship, a very personal matter. The Bill of Rights on the other hand are the laws that place constraints on the power our

government can exercise and as such guarantees the freedom of every American citizen. Lose these rights only at great peril!

Bob Merzi, bmerzi@hotmail.com

Well said. — Dave

Just do it

I am a single woman living way beyond the power and phone lines in the beautiful green mountains of Vermont with my sled dogs, chickens and milk goats (and hopefully next year a Jersey heifer calf and a horse or two). I bought my 11 acres with cash and I have very few bills. I planned it that way—I could have bought 40 acres and then had payments and a job—ugh! No thanks. This way I can be self-employed and sleep thru the night without waking in a panic wondering how I'm going to pay all the bills—my old life. I've just moved back to Vermont after 3 years in the interior of Alaska and am so glad to be home. No more -55 degrees, no more pitch black at 9 am. . . . I would like to tell your readers who would like to make the big move, change their lives, to do it. You really "need" far less than you have been led to believe you need. People from Vermont's largest city, 55 miles away, drive and hike up into these mountains every weekend and I get told so often how lucky I am that I can stay. Yes I am lucky and a day doesn't go by that I don't thank the Holy Spirit for what I've got. However I live in a camper because that's what I can afford. I gather wild apples and berries and can them and eat them when they're in season and I gather wild mushrooms and buy every other food item in bulk and bake all my breads, pies etc. All so that my life stays mine and doesn't belong to an employer 5 days a week. Being a stay at home mom for my animal family is my top priority and not a fancy house and a new vehicle. I just wish everyone would examine

their lives and discover what it is they truly want.

Kathryn Venable
Montgomery Center, VT

Y2K

What has prompted me to subscribe is the appearance of the worst piece of writing I have ever seen in Backwoods Home which is your commentary, "Millennium excuses and the quest for truth." After reading it I realized how balanced, cogent, and well reasoned almost everything else in the magazine is.

The Millennium piece, however, is a serious error on your part. In it you rail against those who predict Y2K doom by very cockily declaring that no threat ever existed and does not now exist. In doing so you plant your feet firmly on the same wet sand as the doomsayers. Both camps are equally arrogant and ignorant of the nature of complex systems. For either camp to presume the omniscience required to predict the behavior of the world economic system is arrogance bordering on insanity.

In this piece you have demonstrated ignorance of the nature of complex systems, ignorance of the large scale computer systems employed by business and government, and ignorance of the phenomenally complex network connecting the worlds' businesses and governments. Worst of all you have behaved irresponsibly towards your faithful readers by denying any possibility that Y2K might cause any disruption for them. Do you really mean that? That, to use your words, it's all "hype", "hysteria", "phony", "psuedoscience". Do you mean Dave, that the probability of Y2K disruption is ZERO? Because that is the tone of the piece. Please tell us if that is what you really meant.

Alan Amenta, Wayne, PA

Perhaps you should read my editorial, and my past comments on Y2K, more closely. I'm making fun of

doomsayers who predict our modern civilization will be brought to its knees due to Y2K. I am not saying there is absolutely no problem associated with Y2K. There are obvious problems (I had to update the magazine's database software) and there will be Y2K-related problems in the new year, but the notion that Y2K-related problems will bring civilization to its knees is absurd. Hurricane Andrew caused huge problems for Florida but Florida recovered just fine. I see Y2K as a bunch of hurricanes—tiny in most areas, moderate in others. Humanity, especially humanity in this country, will get over those problems with little difficulty. Third world countries like Russia will probably have a lot more difficulty. Some industries will do better than others.

Where do I say Y2K poses zero threat? I say the risks are minor, and the editorial makes fun of doomsayers who forecast the end of civilization. — Dave

Applause

Reading your magazine is like sitting down with friends over a cup of coffee. Your articles are a powerhouse of information! Good reading and we enjoy Mr. Duffy's and Mr. Silveira's open minded comments. Thank you Mr. Duffy for opening your bookstore and letting my North Carolina friend and I in to meet your crew a couple weeks ago. Good luck with your expansion! Keep up the work.

Sylvia Jean & Paul Donnelly
Cottage Grove, OR

My compliments to all of you, in particular Mr. Duffy and Silveria for good well thought out and expressed articles and editorials, and Mr. Blunt for the recipes and information in his columns. This is about the best magazine I've ever read.

Gary Tucker
gtucker@cancom.net

Great magazine! I read them over and over and I've got my wife reading them. Got a couple people I work with subscribing also! We always see who gets their magazine in the mail first, then we have some lively conversations while we're doing open-heart surgery and also read through the joke page—that really cuts people up.

Downsized and cut my mortgage payment in half. I plan to be debt free in 5-7 years and more self-sufficient and self-reliant by then also! Thanks again for another great year of a great magazine. P.S. Just got my Nov./Dec. issue. Just had to ask how the fish tasted and how much fight did they put up!

Don Randig, Uniontown, OH

Delicious! The 11-pound red snapper ate a small rock cod I was reeling in. It hit it about two feet beneath the surface. My fishing partner, Mike Philipscheck, actually caught the 30-pound ling cod, and it too had grabbed a small rock cod he was reeling in. Great fight but for a short distance with each. — Dave

Drugs and guns

I enjoyed your article "Should both drugs and guns be legal?" under the My view section of the Sept./Oct. issue of BHM. It brought to mind two quotes which I'm sure you've heard or remember from school.

"Is life so dear and peace so sweet that it must be bought at the price of chains and slavery? God forbid it! I know not what course others may take, but as for me, give me liberty or give me death."

Damn if that doesn't sound like something one of those antagonistic militia types might say. Actually it was said by founding father Patrick Henry over two hundred years ago in a community church in Richmond, Virginia.

And one of my all time favorite quotes—"A people who choose to

ignore history tend to repeat it," which I have seen proven in my time repeatedly.

Anytime you give up freedoms to a government in exchange for security that country is headed for a fall.

Alvin E Bush, St. Amant, LA

The Big Island

Your article on "The good life on the Big Island" in the Nov./Dec. issue has really fired up my interest in moving to Hawaii to live. Because I lived in the Philippines for seven years until I was injured and forced to return to the U.S.A. where I was given a disability retirement. Since then I have greatly missed the island life and have had extreme difficulty trying to readjust to living here on the mainland.

I was not aware that land could be bought for such a reasonable price in Hawaii, which would be the answer to all my problems. But the author of the article still kept the secret because they didn't give any addresses to get more information.

I would love the idea of living on five to twenty acres even if it didn't have electricity and was five to ten miles from town. Just as long as I could drill a water well and not be endangered by a volcano. But I'd prefer electricity if possible and could afford it.

Can you give me an address to write for more information? Thank you.

James A. Nesler, Dayton, TX

There are a couple of points I would like to add to my article on Hawaii.

One is that although I did mention in the article that there's a wealth of info available on the Internet about real-estate on The Big Island, I didn't give any specific addresses for those folks who choose not to deal with computers or have no Internet access.

One excellent resource is a publication called *Homes & Land*, and you may call them at 1-800-277-7800 and

ask for a free copy. Be sure to tell them that you want the Hawaii Big Island issue. Their magazine features full-color pictures and prices (on most of their listings). Don't let the million-dollar homes scare you away, either! Keep looking and you will be pleasantly surprised. And for you Internet enthusiasts, you can find them at www.homes.com. If you would like some direct classified ads, you can contact the *Hawaii Tribune Herald*, Hilo's newspaper, and ask them to send you a sample copy. They will also send you a subscription, and you can request the Sunday paper only for \$11/month. Call 1-808-935-6623, or write to *Hawaii Tribune Herald*, P.O. Box 767, Hilo, HI 96720.

I still recommend the Internet as the best resource, and there are lots of ways you can access the Internet even if you have no computer. Many libraries have Internet access, and you can always ask a friend with a computer to print out some info for you, or even to look it up with you. You need only type "Hawaii real estate" into any search utility, and you'll come up with tons of leads.

The other point is that I want to make it very clear that Hawaii is not for everyone. Every day, folks come here and are instantly enamored of the magical feelings of these Islands, and some of them decide they just have to live here. So they pack their belongings into a shipping container and move on over, and in a few months or maybe a year, they discover that this isn't "America." It's much like being in a foreign country, with a very different culture, and that culture comes with a different attitude and a different energy than that of most places on the mainland. A lot of the locals here refer to the mainland as "America," and prefer to think of the Hawaiian Islands as a separate country. Their separate country. Not wishing to get into a lengthy political discussion here, there are certainly

lots of good and valid reasons for their preference. We consider it a privilege to be able to live here.

Things work quite differently here, and if the way they work fits in with your desired lifestyle, there's a good chance you'll find Hawaii to be your special place. It's a very laid-back lifestyle, and if you can live with and love it, that's a good start.

The key, of course, is to be at peace with this lifestyle, and if that comes natural to you and feels very good to you, you've got it made. If it feels like it will take all the patience you can muster to put up with the leisurely ways of the Islands, then this might not be your cup of tea. There's a magical feeling here. We call it Aloha. It's alive and well, and to some it's so powerful and pervasive that it soon becomes an essential part of life. To others, it seems not to exist. I've had friends from the mainland come to visit and notice nothing; others feel it profoundly. I even had one friend tell me that she surely feels the ambience of love and acceptance here but she thought it was some kind of tourist-trickery being played by the Visitor's Bureau! And she was serious! The big Island is home and host to many spiritual events, sessions, celebrations, and workshops from many differing disciplines. The Zen Temple in Wood Valley hosts these kinds of events all year long, and others take place in less formal surroundings, like in some of the sacred and powerful places all over this Island. The Magic here is one of the big reasons why so many people are drawn here for their spiritual work. It's somehow so easy here . . .

This is a generalization, but I believe those who last here are the people who Know in their Knowingness the minute they first breathe Hawaiian air that they have come home and that this is where they must be.

Aloha Nui Loa — Skip Thomsen,
<http://www.mailbooks.com>

2nd Amendment article

Some more “ammunition” for Mac’s argument with Bill in John Silveira’s article “We Don’t Need No Steenkink 2nd Amendment.” This passage shows that when the 2nd amendment was written, the right to bear arms given to “a well regulated militia” was not considered to mean only a military force. “As civil rulers, not having their duty to the people duly before them, may attempt to tyranize, and as the military forces which must be occasionally raised to defend our country might pervert their power to the injury of their fellow citizens, the people are confirmed by the article in their right to keep & bear their private arms.”—Tench Coxe in “Remarks on the First Part of the Amendments to the Federal Constitution.” Under the pseudonym “A Pennsylvanian” in the Philadelphia Federal Gazette.

I appreciate your obvious hard work on this magazine. I hope that more articles like Mr. Silveira’s will show Americans that the rights guaranteed to us by our Constitution were intended to protect us from the tyrannical government that our founding fathers were personally familiar with.

Gary Keaton
Gary.Keaton@delta-air.com

After reading John’s article, “We Don’t Need No Steenkink Second Amendment” I was moved to order not only a subscription to your magazine, but 10 reprints of the article to share with other folks I know. I had never heard of your magazine before yesterday, and have no idea what I’m going to get once the issues begin to arrive, but if all I get that I like is that one simple short story, then it was a bargain. Reading the article has raised a huge question for me, though. Is Mac a real person? If he isn’t just a fictional character in the story, maybe we could convince him to run for president.

Ernie Roberts, Amelia, VA

Is Mac real? Is the Pope Catholic? Does the bear . . . ? — Dave

Read your online material on 2nd amendment and Bill of Rights. Was reminded that many years ago (about 35) when I was in Toastmasters and gave a speech on the right to bear arms, and used a couple of books that covered the material that you discussed. Covered meetings, letters, memos, notes, etc. of our founding fathers that was the foundation of the 2nd and Bill of Rights. I have since lost in memory the titles and authors of these books.

So the attack on our rights obviously in this area is not new. Right along with the UN’s “World Disarmament Initiative,” which is not just about individual countries disarmament, but individual disarmament.

Ron Boschelli
rockypcl@midwest.net

Religious editor

Since you occasionally write about religion you should have a religious editor:

1. to provide balance
2. to provide more religious objectivity since you folks aren’t acquainted with the fine points of the Christian religion
3. to give those of your readers who are religious someone with which to identify
4. possibly to enhance your articles about home schooling, since I would suspect that the vast majority of home schoolers are doing this at least partly for religious reasons.

. . . I already hear you. You’re saying, “We aren’t in the business of promoting religion or publishing religious articles.” But you aren’t in the business of home schooling either. Religion is a huge part of many peoples’ lives. It would be useful to you to recognize that.

Michael Briggs, wmbiggs@gte.net

Baked beans

Hi. Last night, we ate Vermont Baked Beans from Richard Blunt’s article in issue No. 60. Delicious! I had never made baked beans before. They don’t even compare to that canned stuff. Just one note, though. I believe Mr. Blunt meant to saute the onions until translucent rather than opaque.

Heather E Raffa, her@wans.net

You are correct. — Dave

Solar max

For the most part Y2K was never a serious problem for the next century. However the start of the next century has a solar wind maximum called a “solar max”. Since the last solar max, the dependence on satellite communications has grown significantly. That includes bank transactions, TV, etc. Solar max will temporarily blind such services. Many of the satellites are not qualified to handle a solar max so many services will be knocked out, including weather and defense surveillance. That is the real problem we are facing. It will not be the end of the world, but it will have a significant impact.

Joe Brandelik
brandeli@erinet.com

Send in the Waco Killers

After reading the book review of Send in the Waco Killers I placed an order with the local bookstore. As you can see from the enclosed computer print-out they say the book is out of print. It has, however, increased in value if a used paperback is selling for \$37.50. What is really happening here. Is it out of print or just not handled because it is considered politically incorrect?

John Bull, Everett, WA

Good question. We have plenty of copies here at \$24.95 each. — Dave

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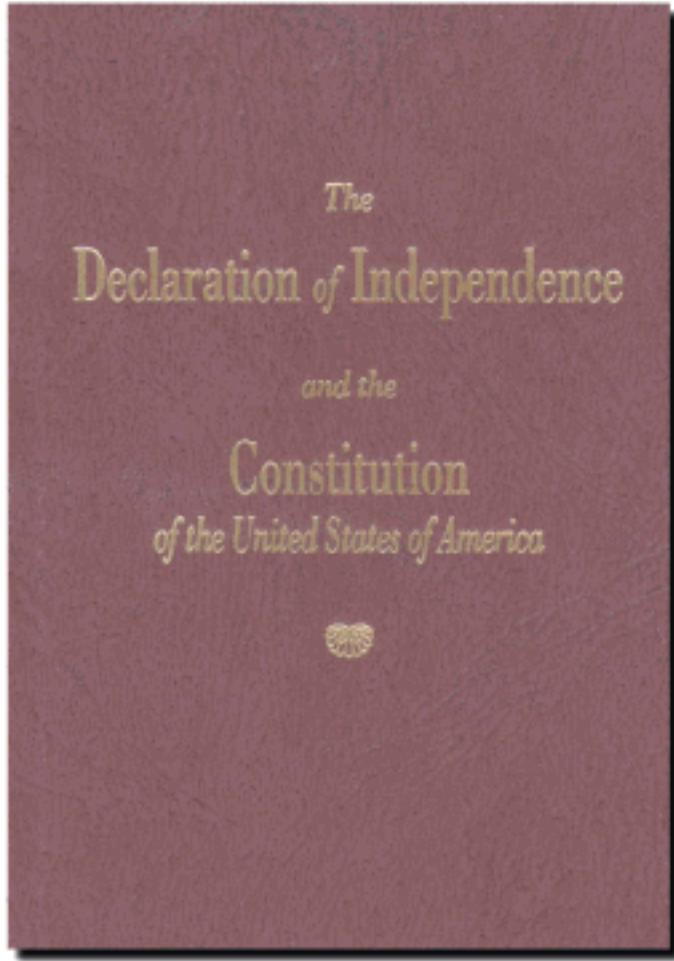
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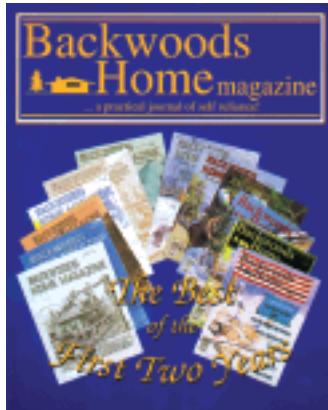
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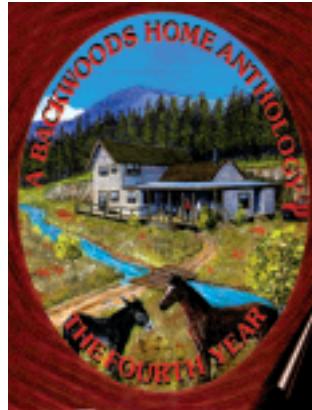
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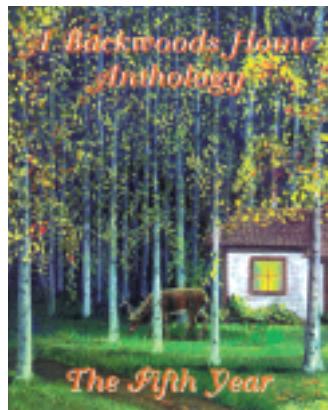
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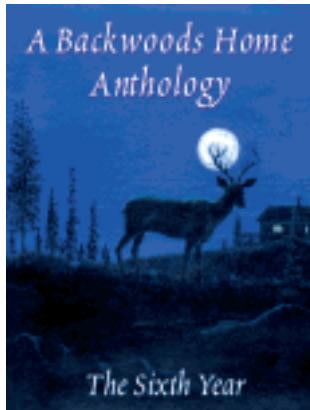
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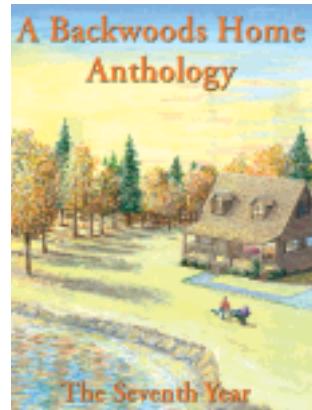
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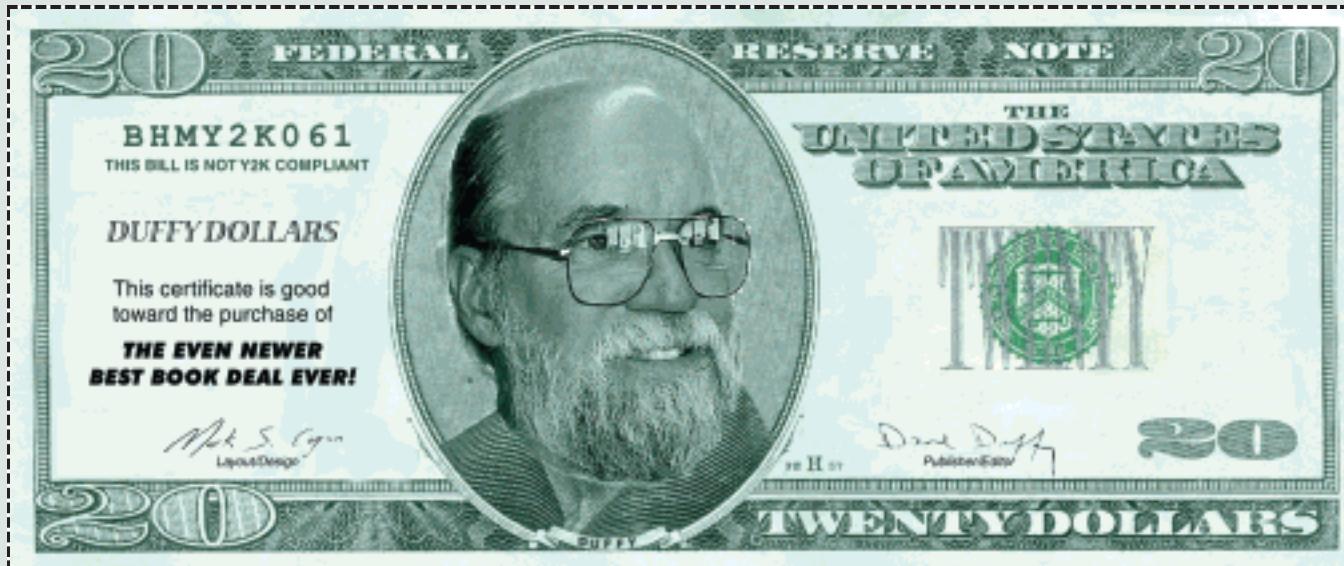
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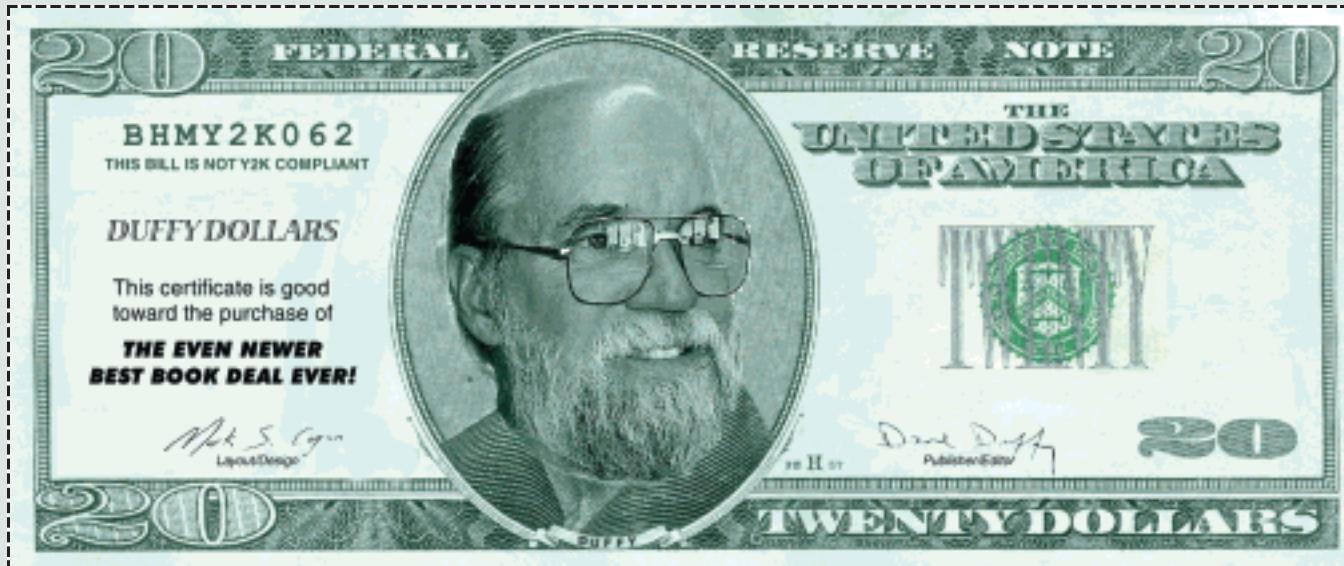
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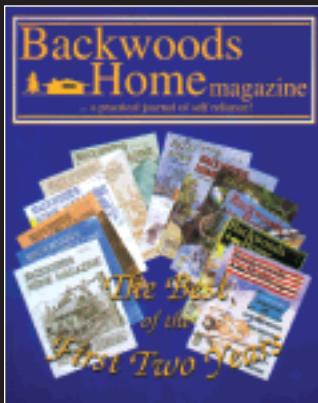
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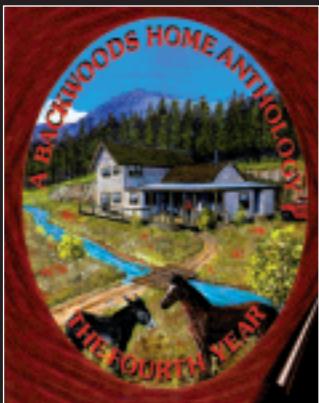
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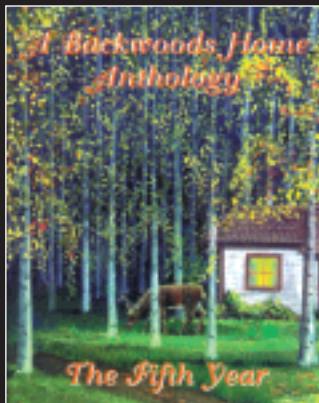
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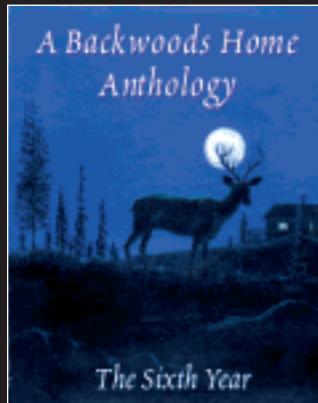
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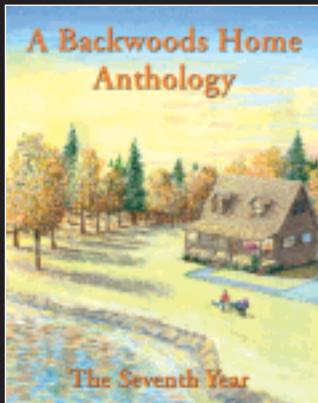
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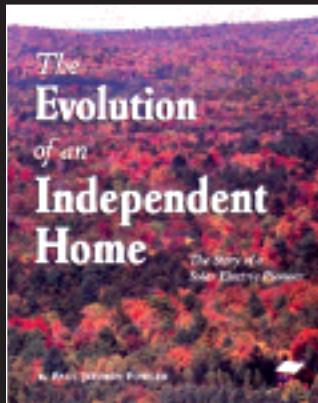
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